

Figure 1A

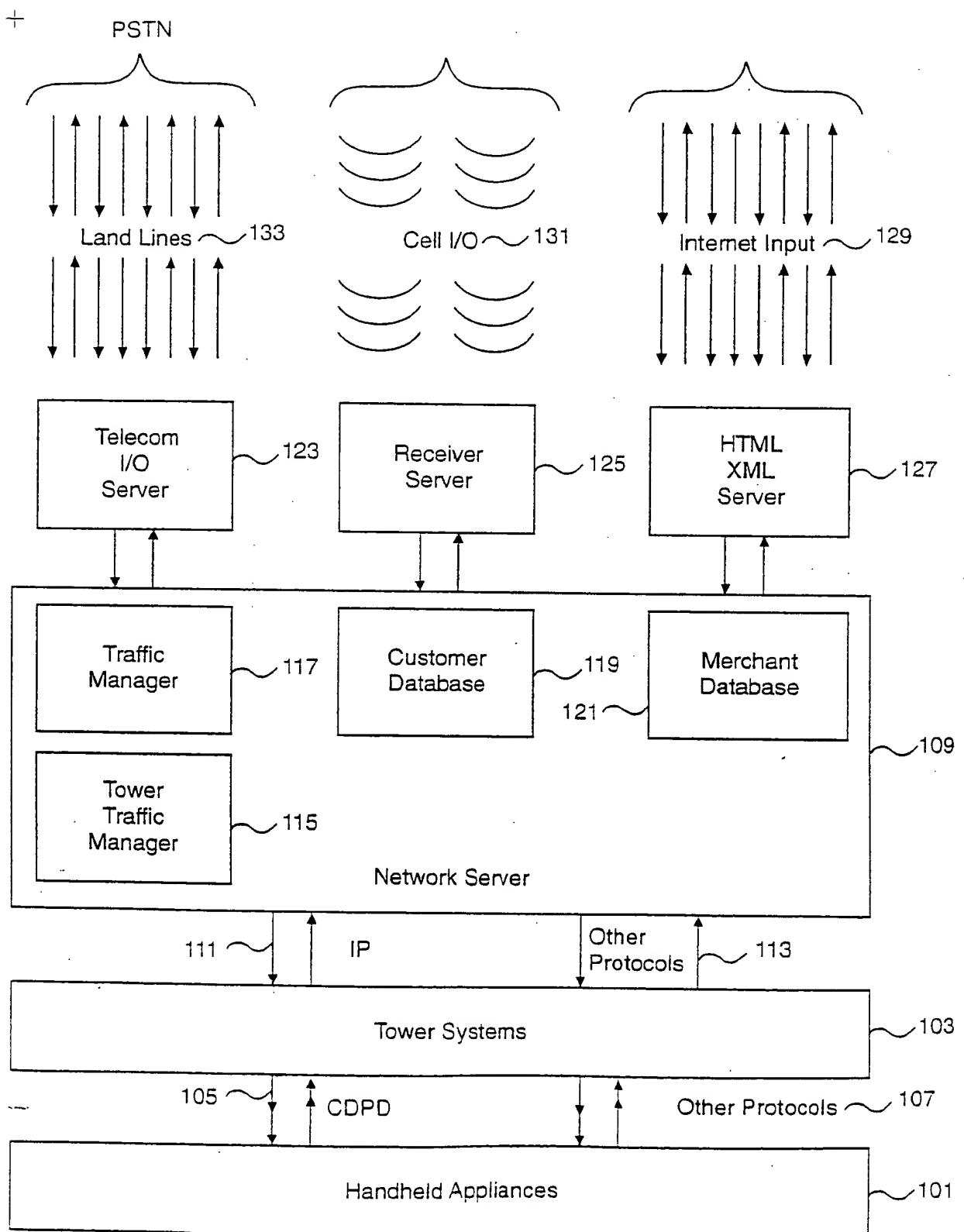


Figure 1B

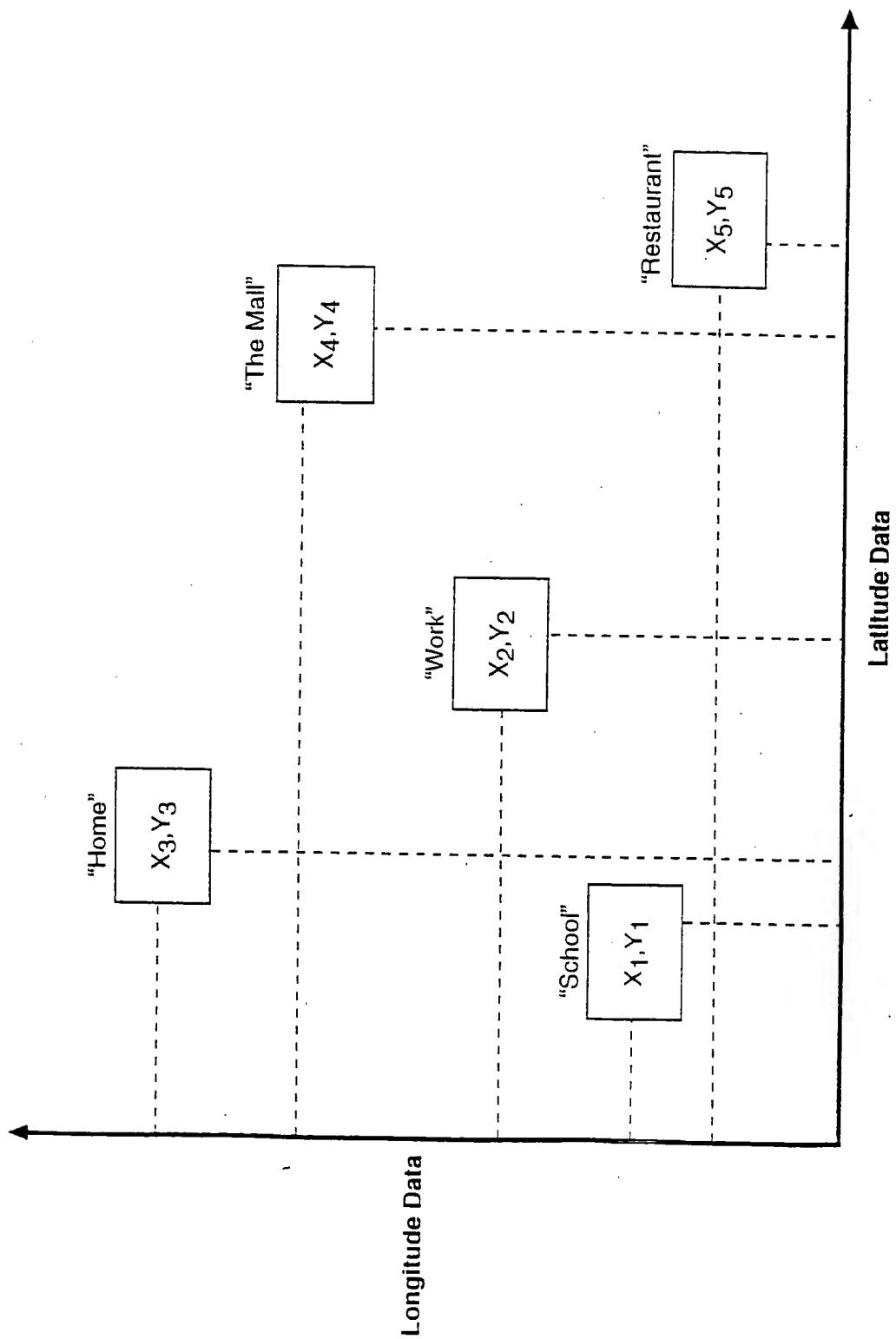


Figure 1C

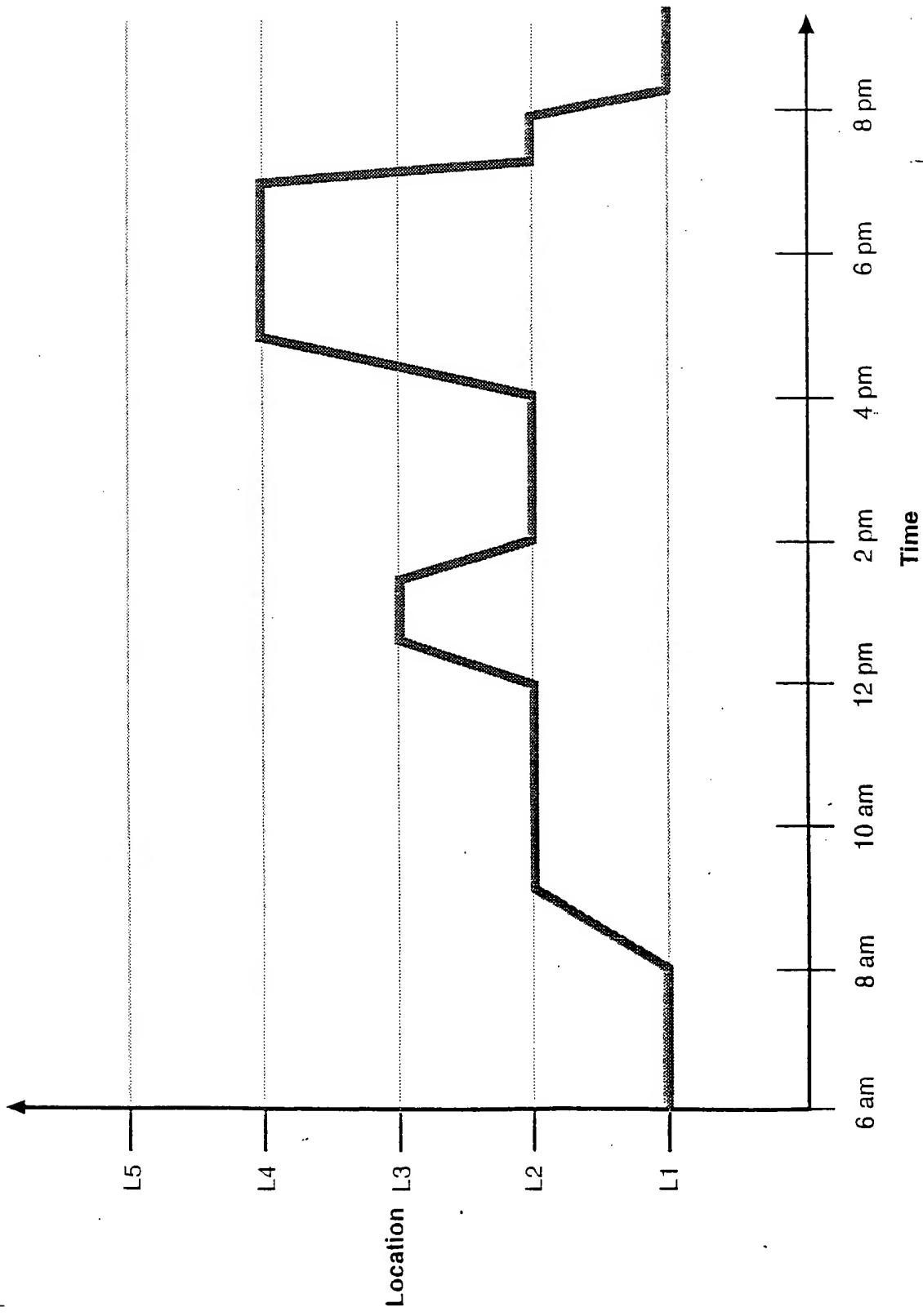


Figure 1D

Biographic Data		Data	Confidence	Correlation
151 ~	Name	Sue	High	Yes
163 ~	Gender	Female	High	Yes
165 ~	Age	13	Medium	Yes
167 ~	Ethnic Background	Chinese-American	Medium	No
Demographic Data				
153 ~	Culture	American	Low	No
171 ~	Region	East Coast	High	Yes
173 ~	Likely Family Income	High	Low	No
Preferences Data				
155 ~	Action Movies	High Interest	High	No
177 ~	Hip-Hop Music	Low Interest	Low	No
179 ~	Clothing from The GAP	High Interest	High	Yes
181 ~				

Figure 1E

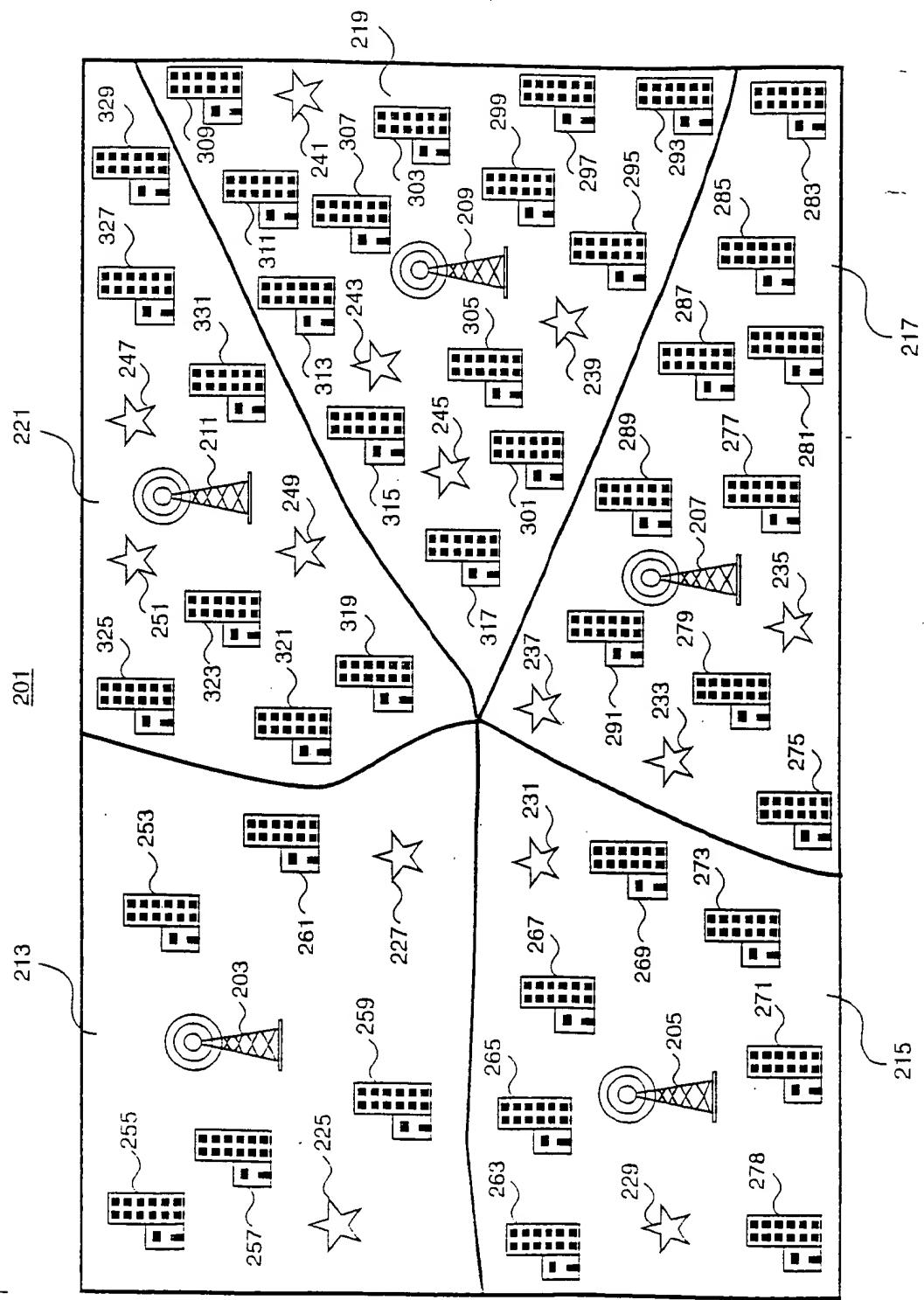


Figure 1F

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
203	213	221	225 Riding Stables	253 Game Arcade
		215	227 Water Park	255 Video Store
				257 Taco Stand
				259 Book Store
				261 Riding Supply Store

Figure 1G (1 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
205	215	213	229 Aunt Jane's House	263 24-Hour Gym
		217	231 Linear Park	265 Ice Skating Rink
		221	233 Pottery Supply Store	267 Sporting Goods Superstore
				269 Promdress Shop
				271 Belgian Chocolate Store
				273 Pet Store
				278 Model Train Store

Figure 1G (2 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
207	217	219	235 Candy's House	275 Corn Maze
		221	237 Resale Boutique	277 Aquarium
		215		279 Museum
				281 I-MAX Theatre
				283 Movie Theatre
				285 Laser Tag Facility
				287 Pizza Place
				289 Zoo
				291 Public Library

Figure 1G (3 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
209	219	217	239 Home	293 Mall #1
		221	241 School	295 Mall #2
			243 Work	297 Chinese Food
			245 Suzy's House	299 K-Mart
				301 Target
				303 Record Store
				305 Batting Cages
				307 Golf Driving Range
				309 Computer Superstore
				311 Boy's Club
				313 Church #1
				315 Restaurant #14
				317 Bicycle Shop

Figure 1G (4 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
211	221	219	247 Uncle Clay's House	319 Metro Stop
		217	249 The Gap	321 Starbucks
		215	251 Grand Mother's House	323 Bowling Alley
		213		325 Antique Mall
				327 Tennis Facility
				329 Car Stereo Superstore

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Figure 1G (5 of 5)

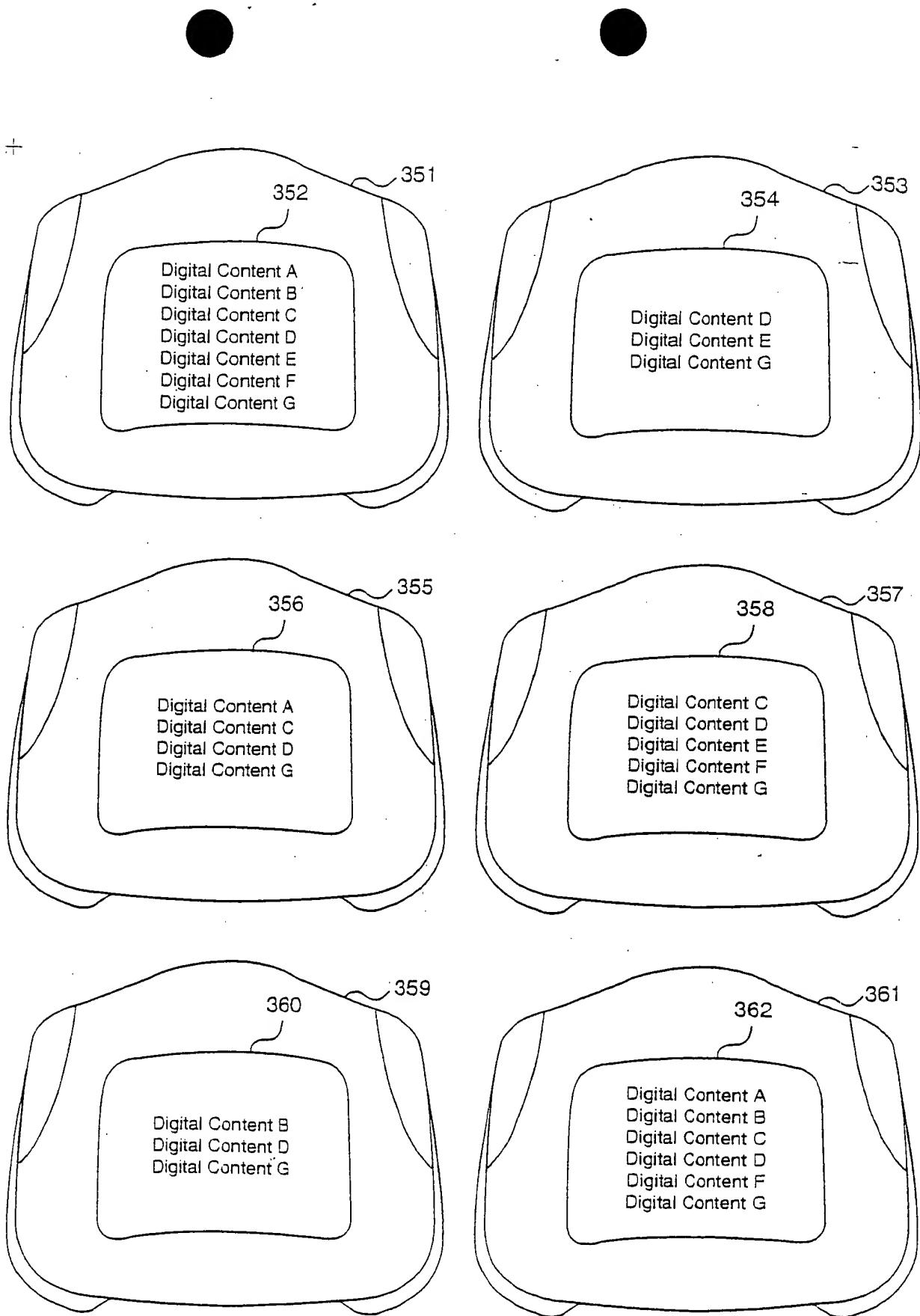
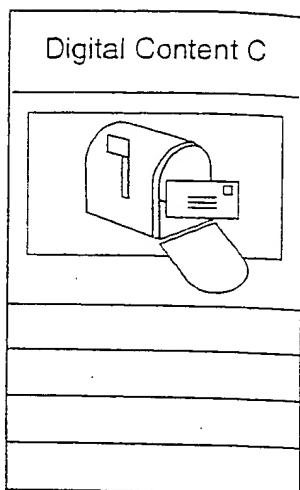
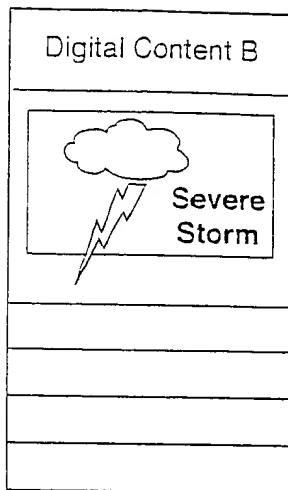
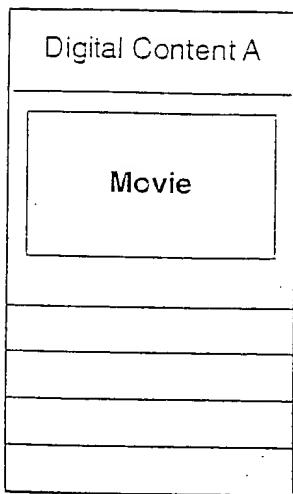


Figure 1H

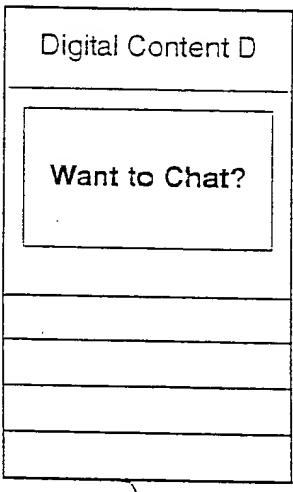
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Digital Content A 385	Movie	Merchant #12	Advertisement	X, Y	0	5	LATLONG1	After School	Incrementally Larger with Location
Digital Content B 387	Text and Alarm	Government Entity	Warning	Weather	0	0	Various	Immediate	One Time Only
Digital Content C 389	Graphical Icon	Friend #1	Email Message		2	0	N/A	ASAP	7 Days
Digital Content D 391	Text Message	Acquaintance #3	Request for Chat		5	0	N/A	ASAP	3 Hours
Digital Content E 393	Executable Spreadsheet	Merchant #2	Survey	L, M	0	20	LATLONG2	Between 12/1 and 12/25	25 Days
Digital Content F 395	Text Message	School	Announcement	Sporting Event	1	0	N/A	Between 3:00 pm and 10:00 pm	Incrementally Larger for 7 Days
Digital Content G 397	Calendar File	Soccer Team	Schedule		3	0	N/A		User Initiated for 2 Days

Figure 11

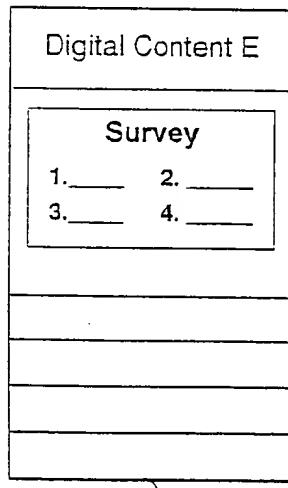


387

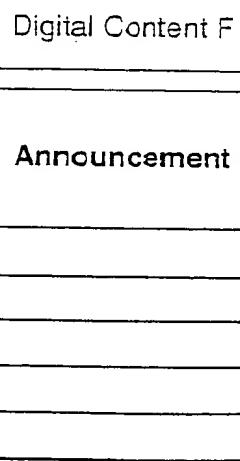
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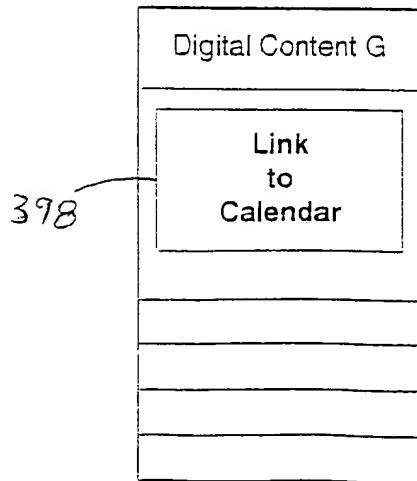
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Figure 1J

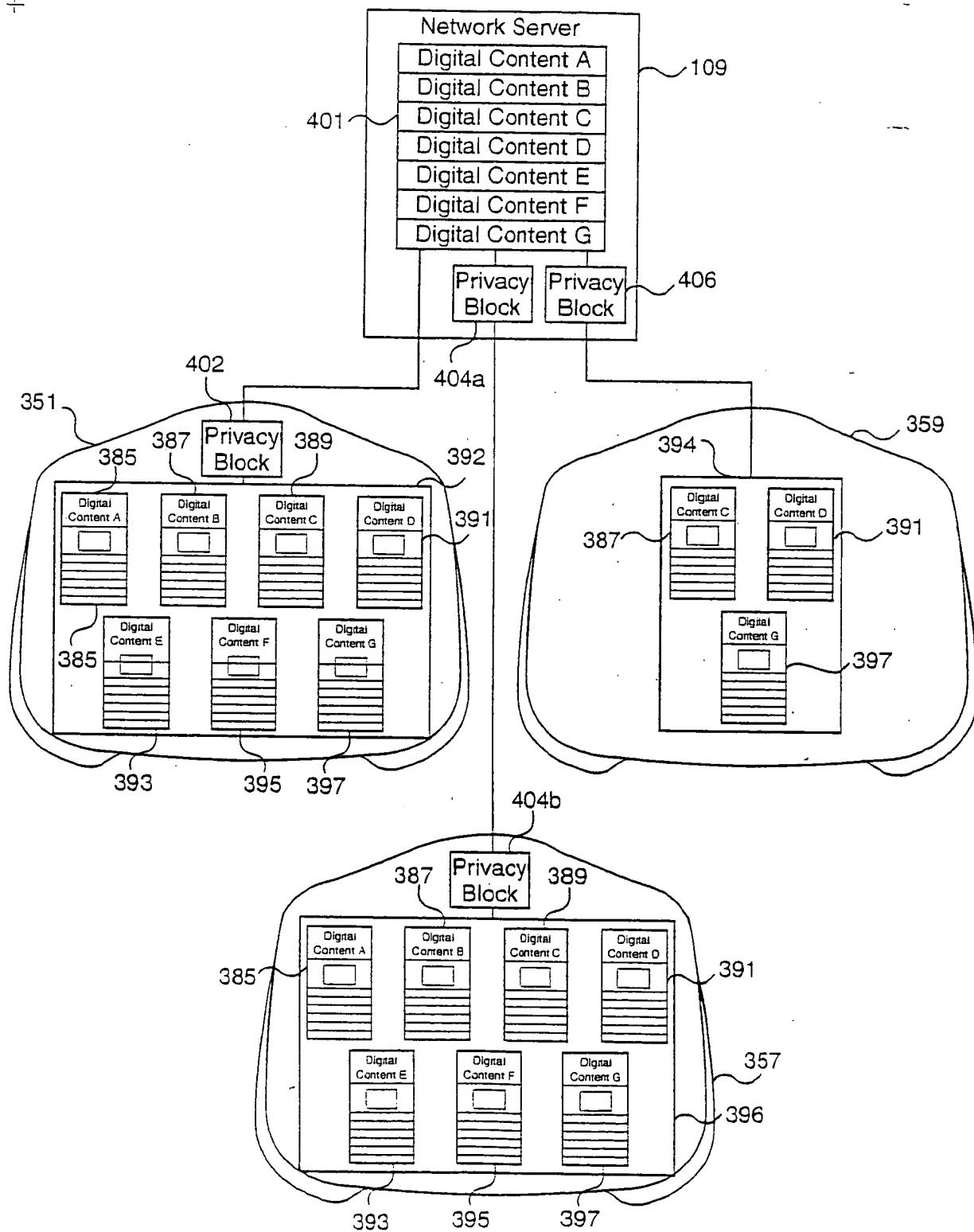


Figure 1K

Contextual User Profile											
User/ Appliance	Static Components			Dynamic Data Components			Relationship Preferences				Privacy Block
	Biographic	Demographic	Cultural	Latitude	Longitude	Time	Date	Available Energy	Food Pref.	Entertainment Preferences	
351	B1	DM3	C1	LATLONG1	4:00 pm	12/5	130	F1	E1	R3	P1
353	B3	DM2	C2	LATLONG2	4:30 pm	12/5	43	F2	E3	R2	P2
355	B2	DM1	C3	LATLONG3	5:00 pm	12/5	62	F3	E2	R1	P3
357	B1	DM2	C1	LATLONG4	4:00 pm	12/5	227	F3	E1	R1	P4
359	B3	DM3	C2	LATLONG5	4:30 pm	12/5	39	F2	E3	R2	P5
361	B1	DM3	C3	LATLONG6	5:00 pm	12/5	200	F1	E2	R3	P6

Figure 1L

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427b

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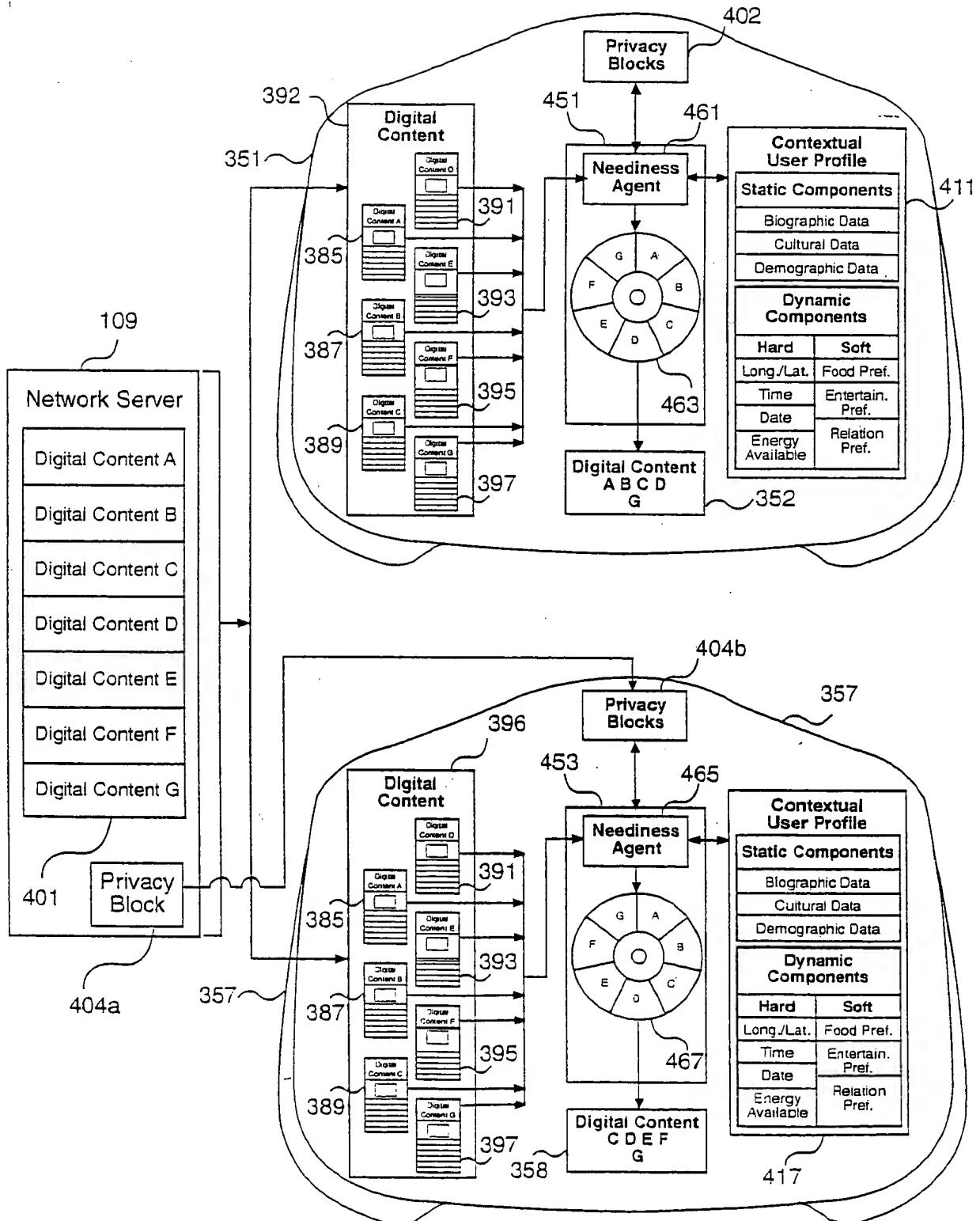


Figure 1M

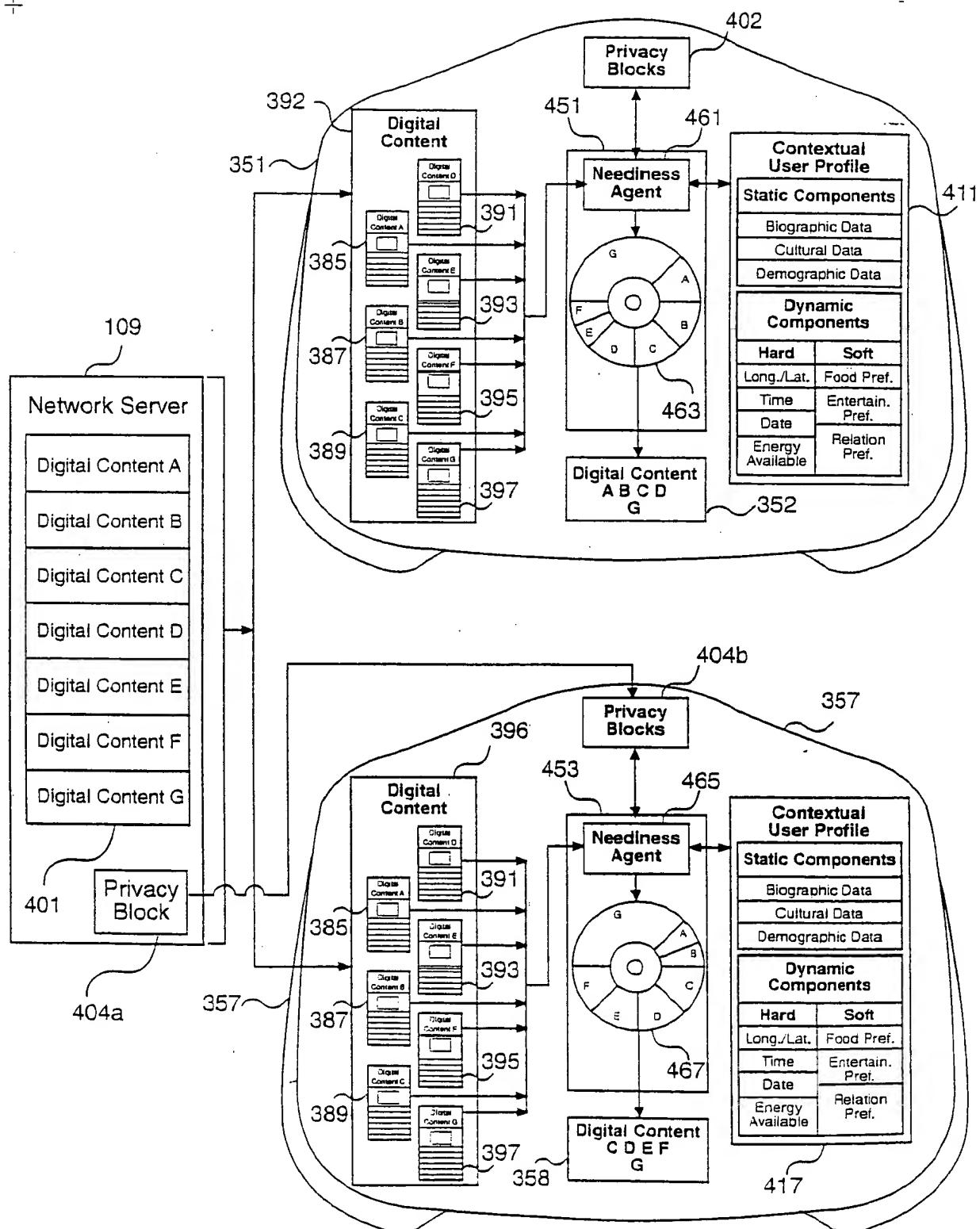


Figure 1N

Relationship Network as the content distribution mechanism

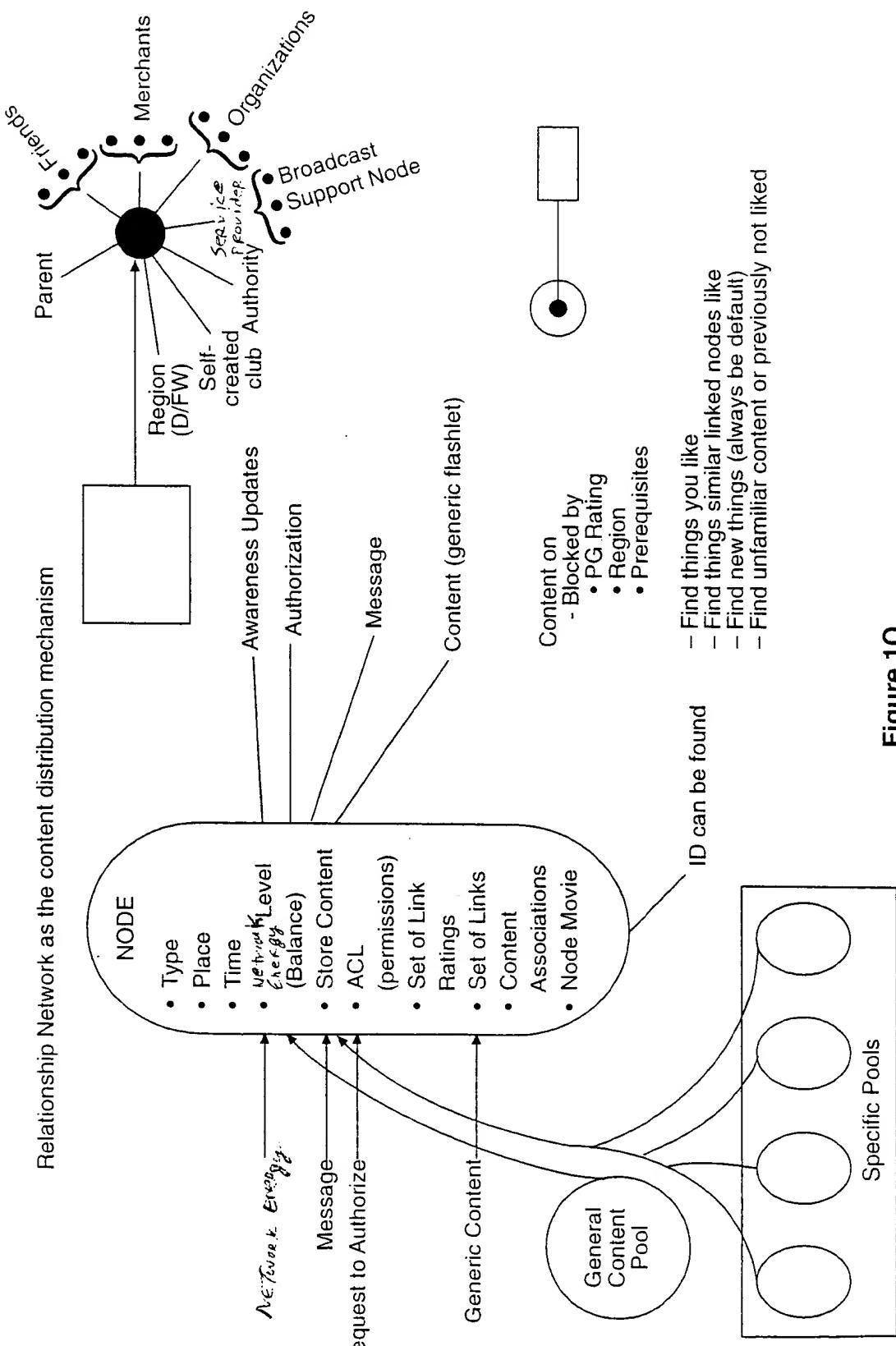


Figure 10

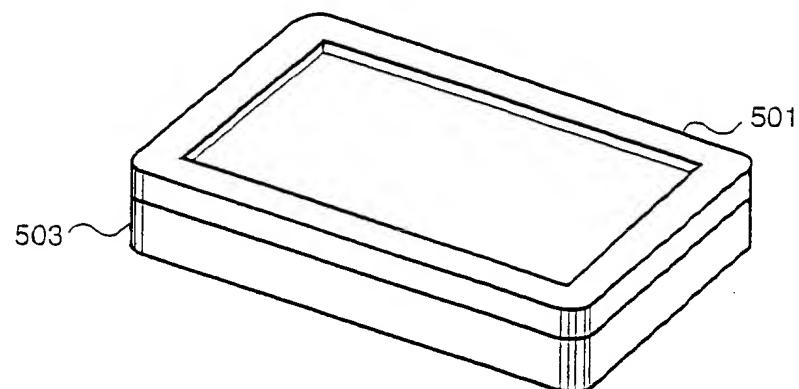


Figure 2A

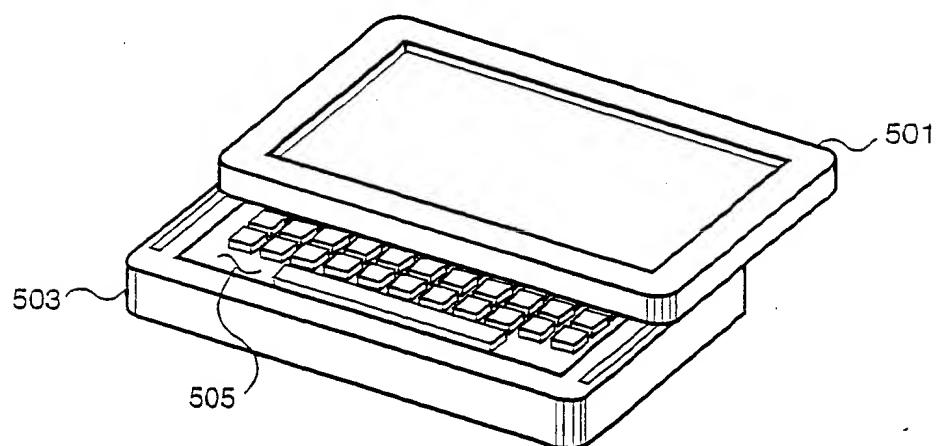


Figure 2B

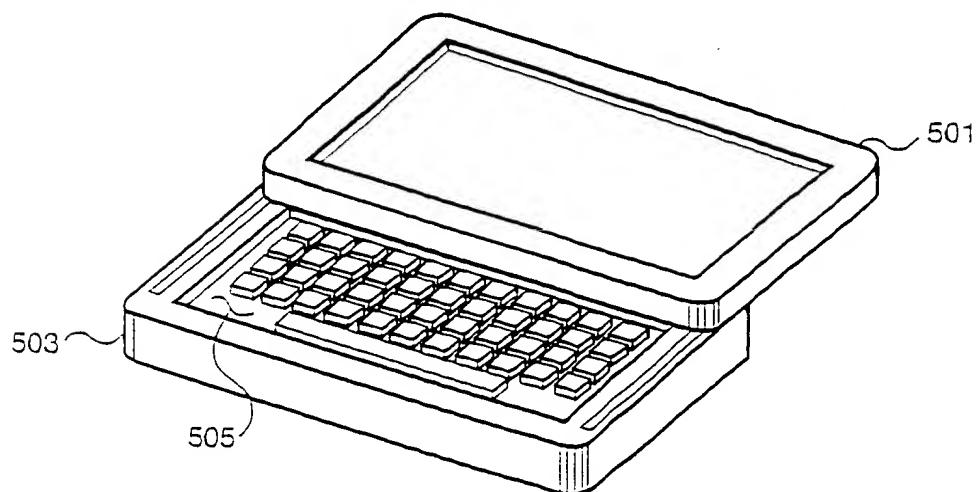


Figure 2C

201304141626 - 0242562

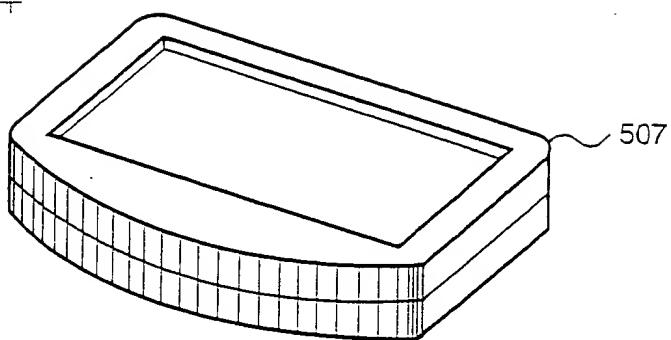


Figure 2D

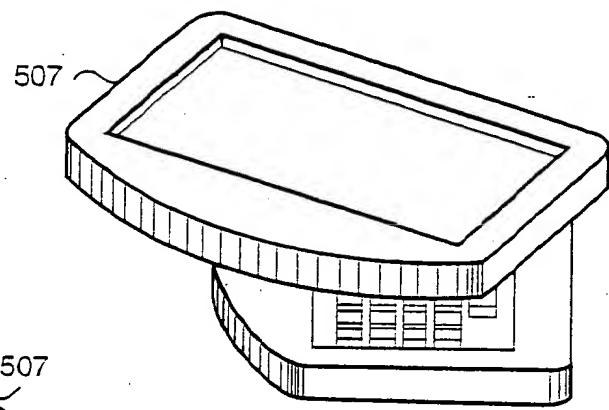


Figure 2E

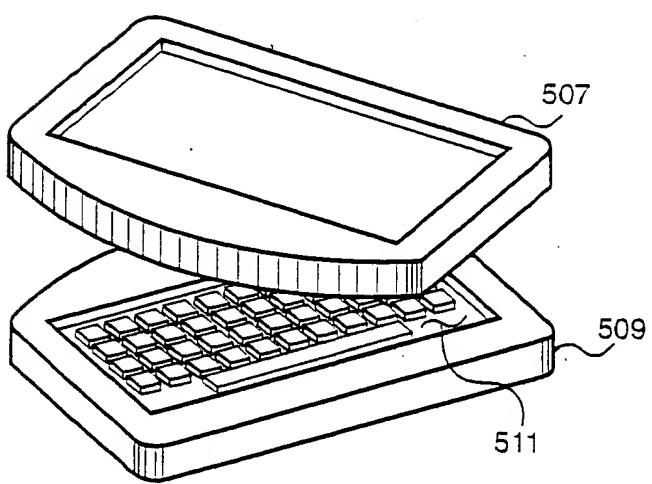


Figure 2F

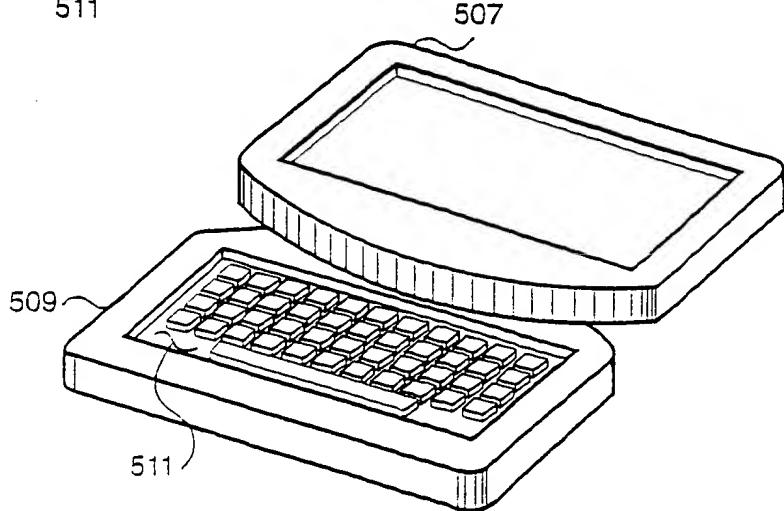


Figure 2G

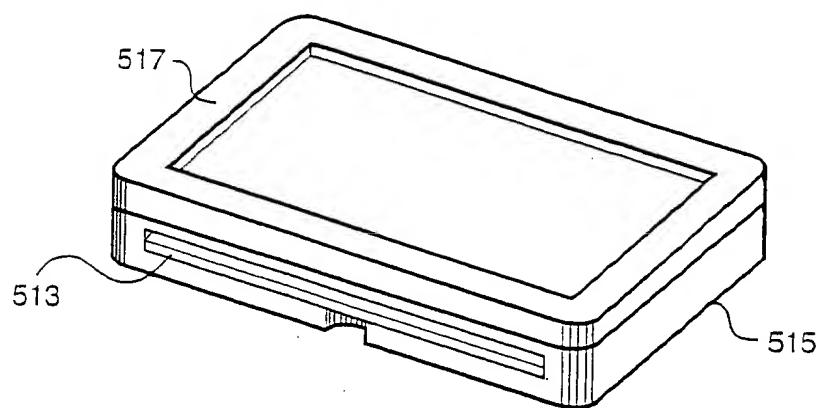


Figure 2H

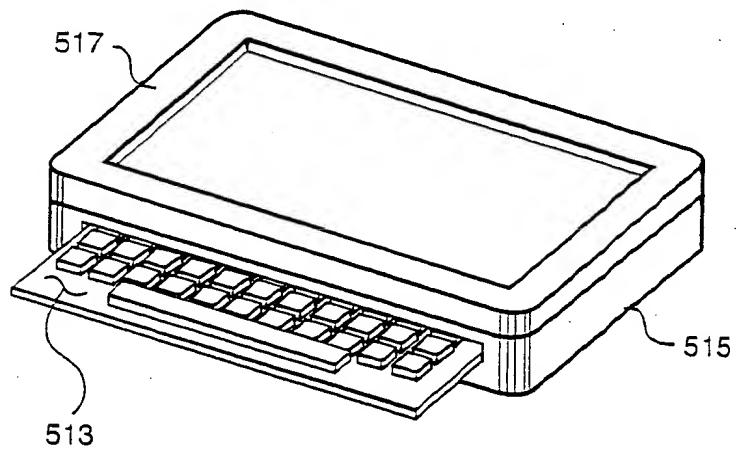


Figure 2I

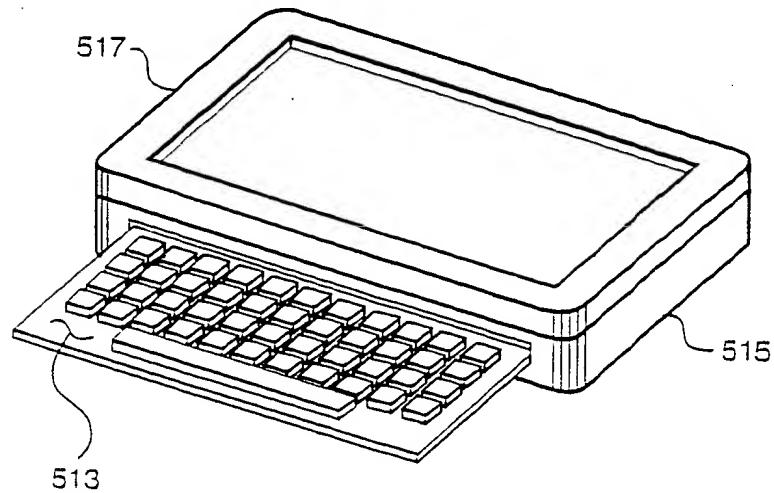


Figure 2J

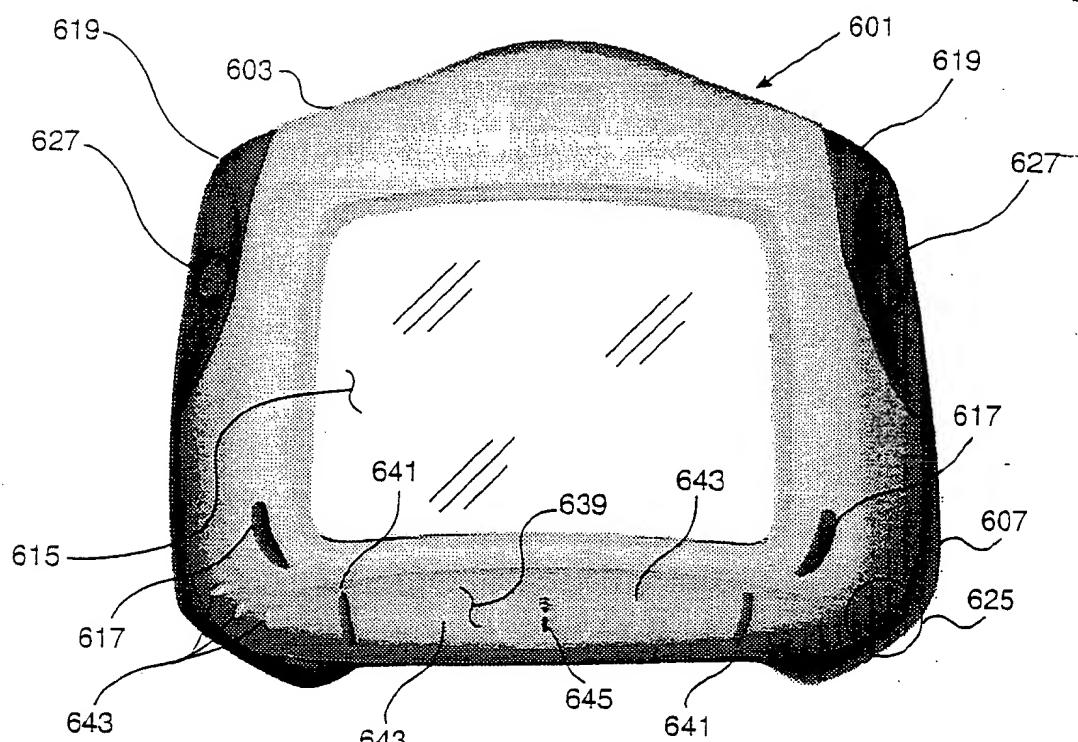


Figure 2K

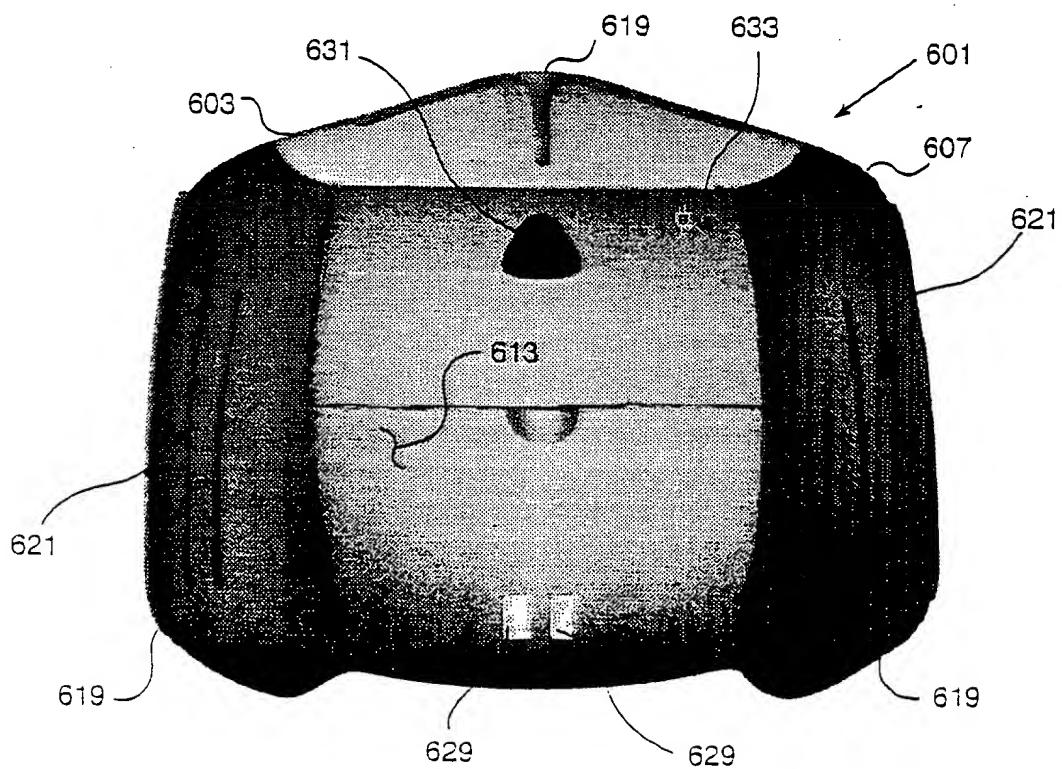


Figure 2L

Figure 2N

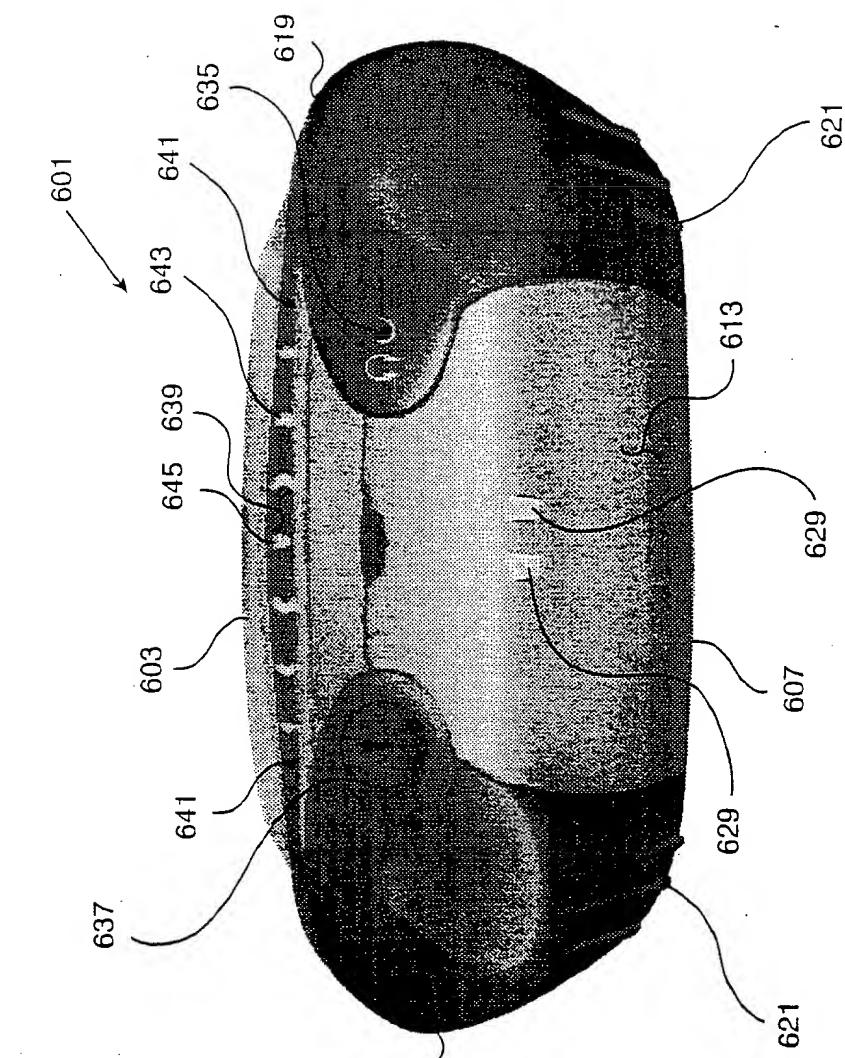
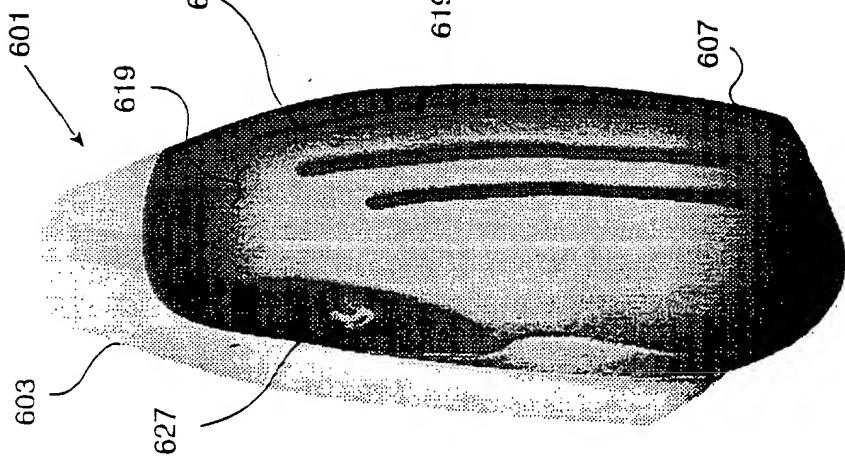


Figure 2M



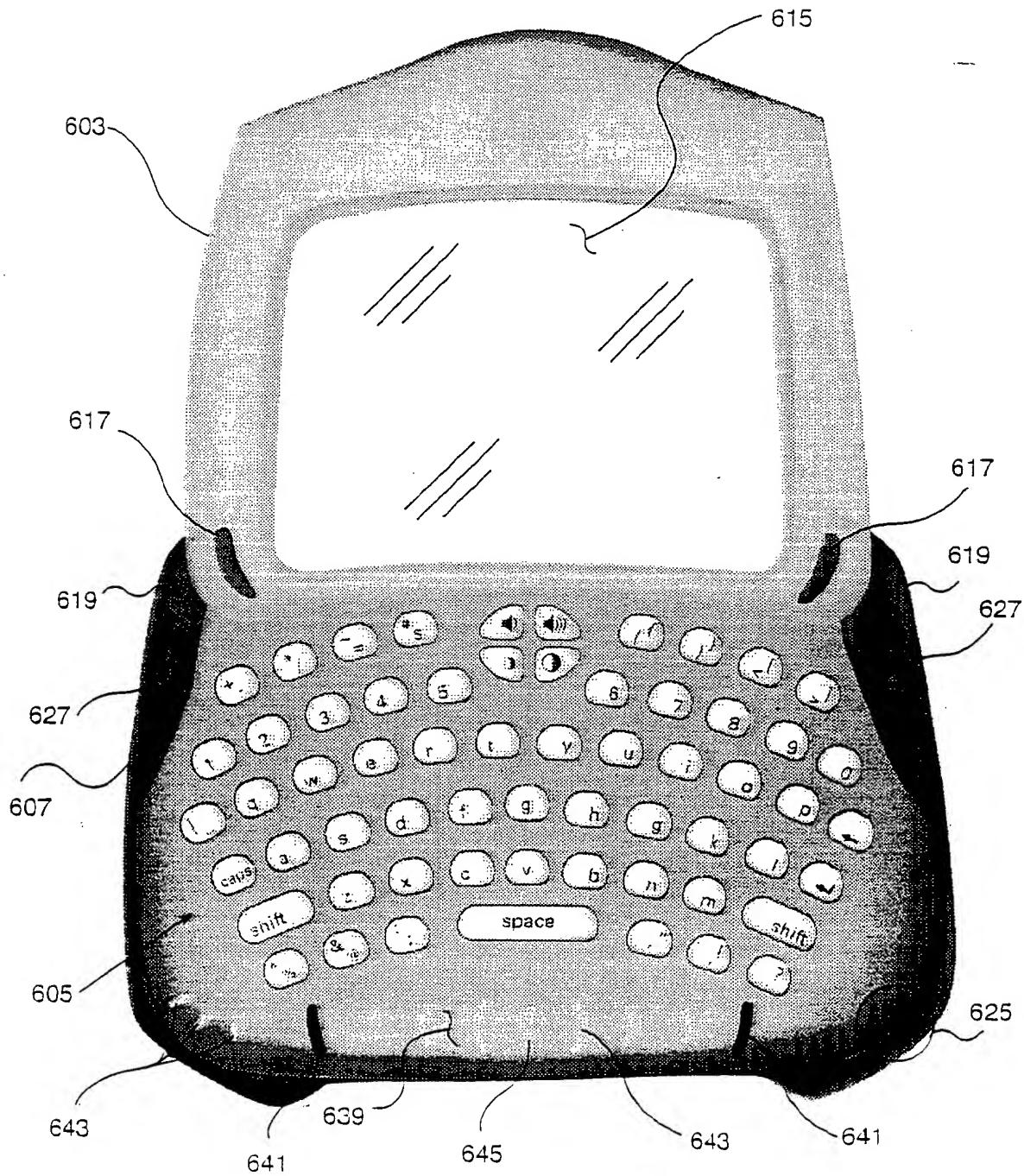


Figure 20

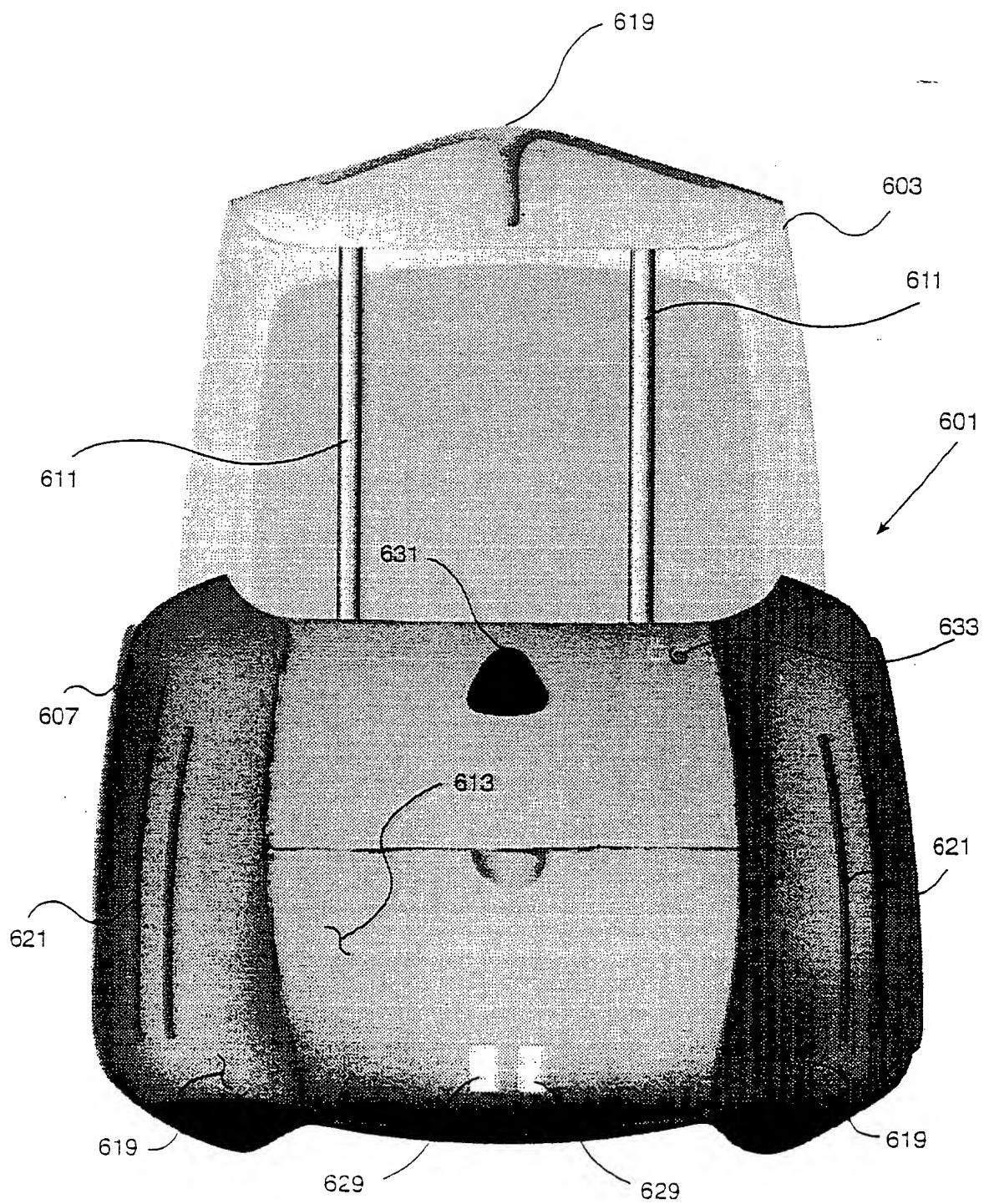


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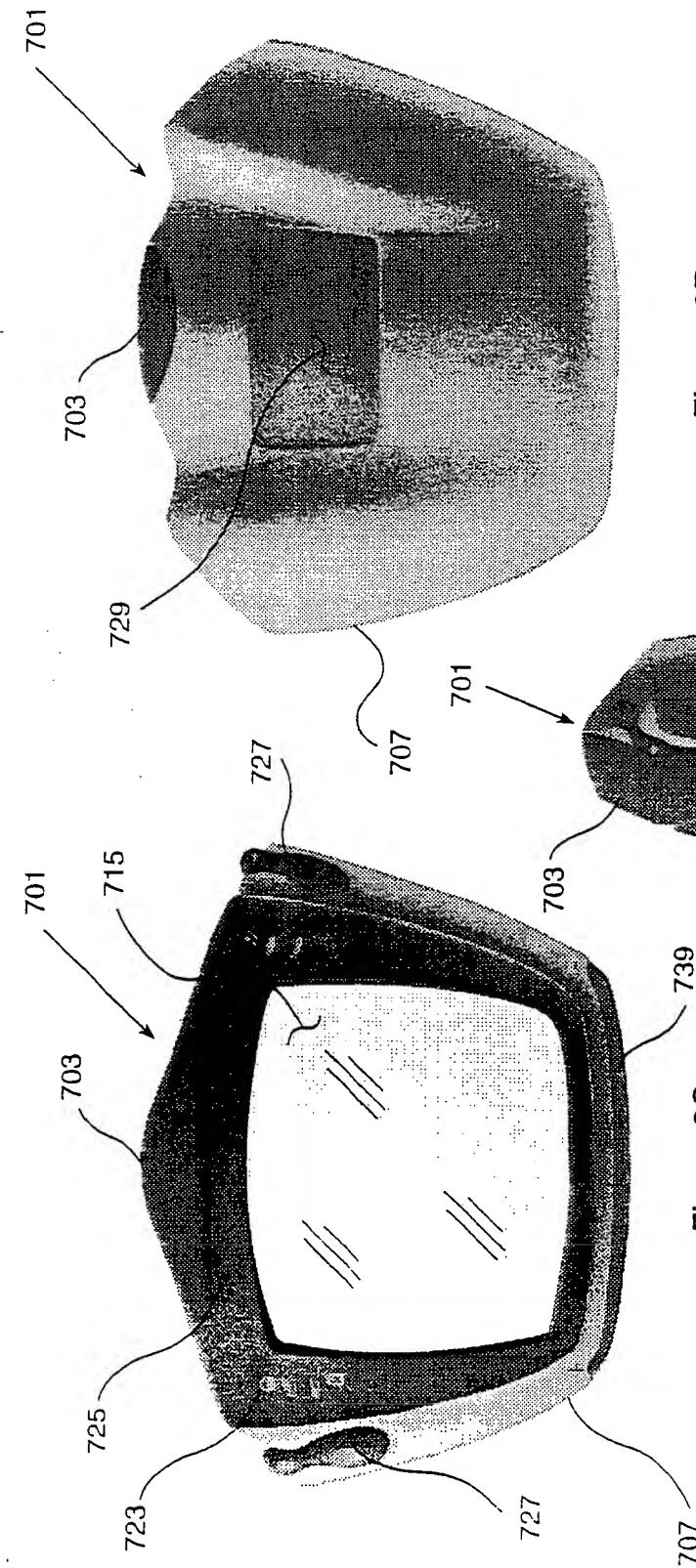


Figure 2R

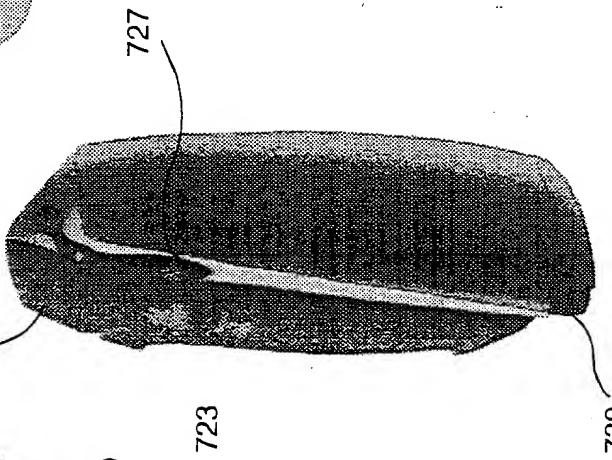
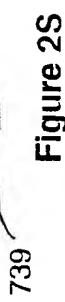


Figure 2Q > 739



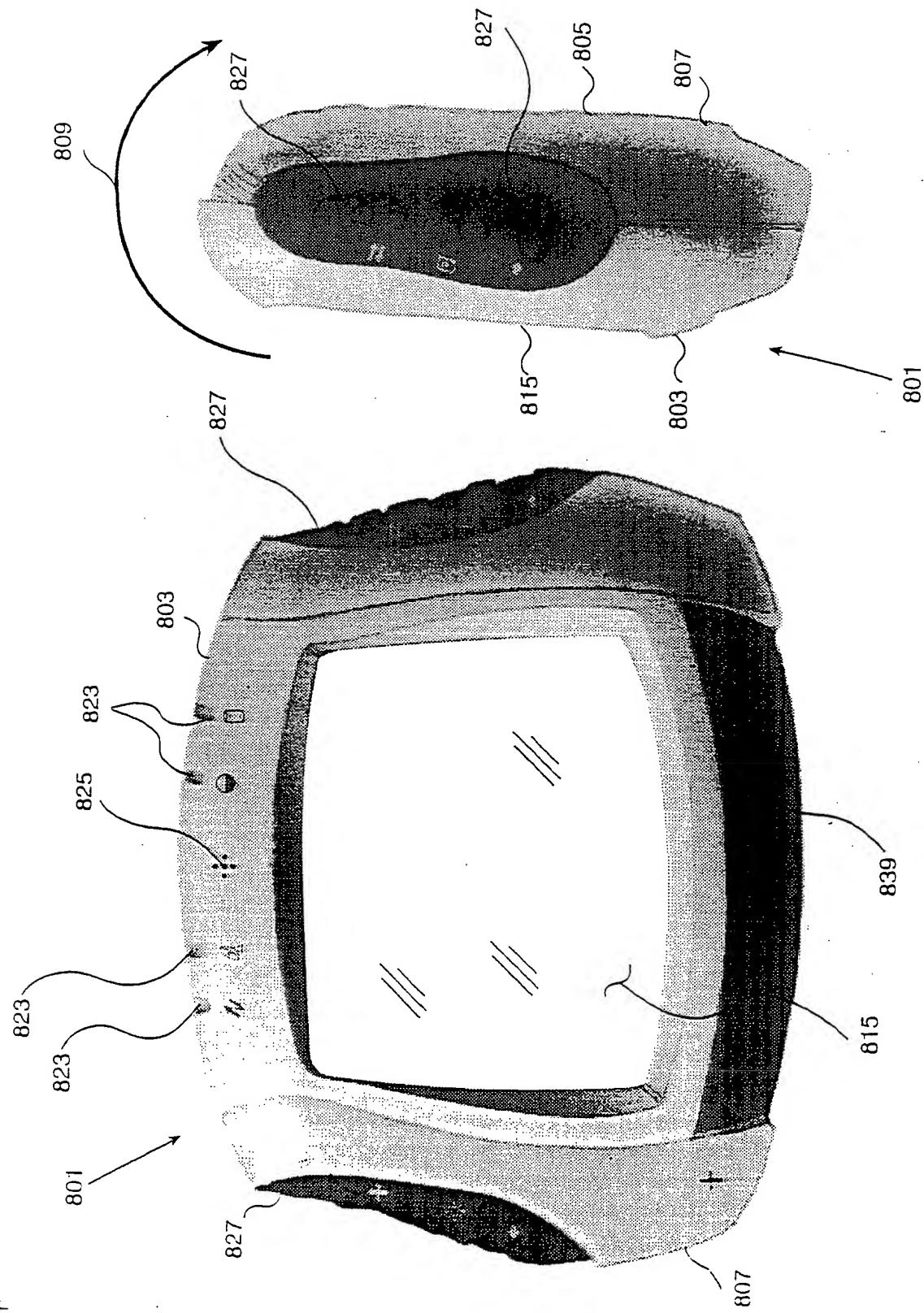


Figure 2T

Figure 2U

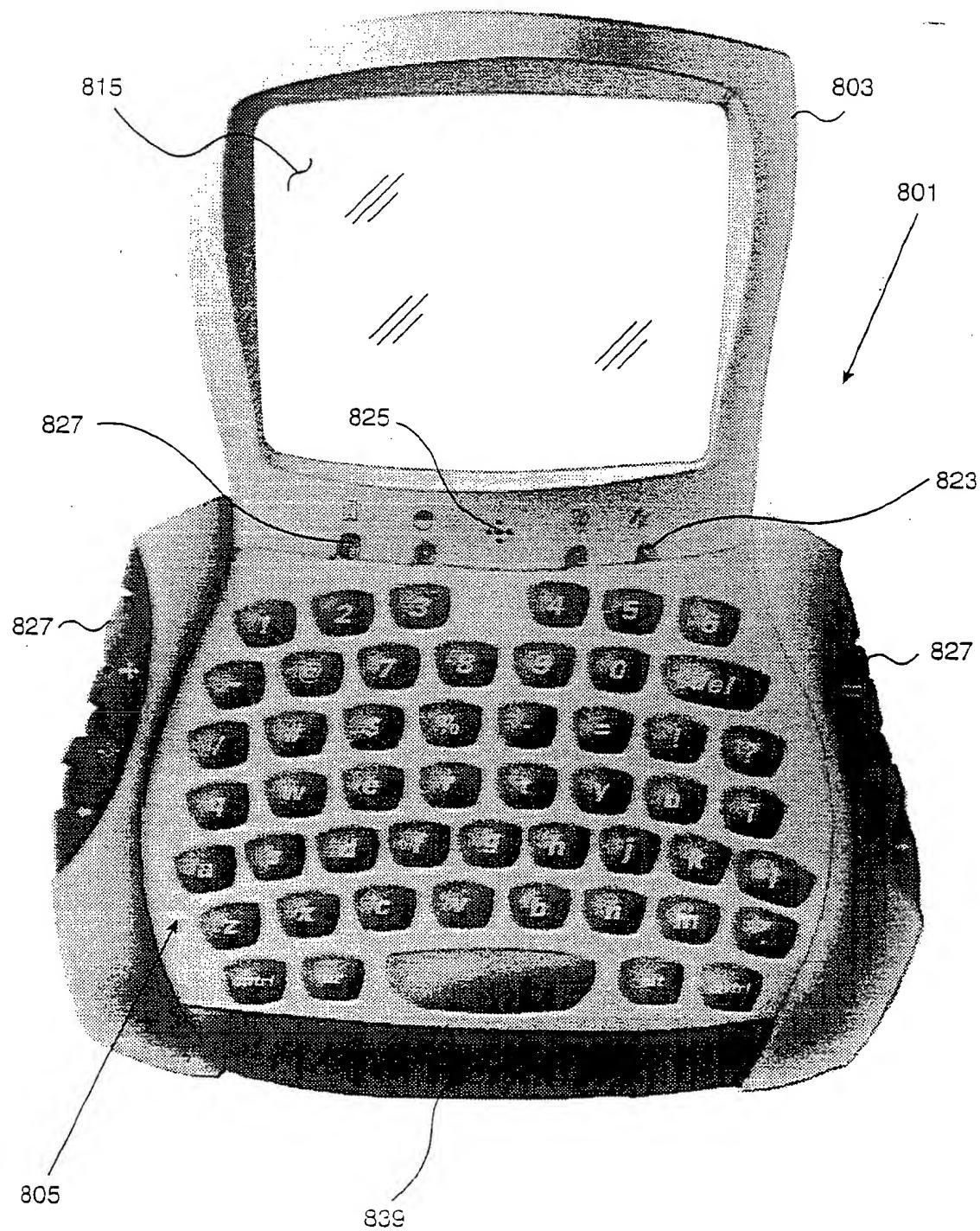


Figure 2V

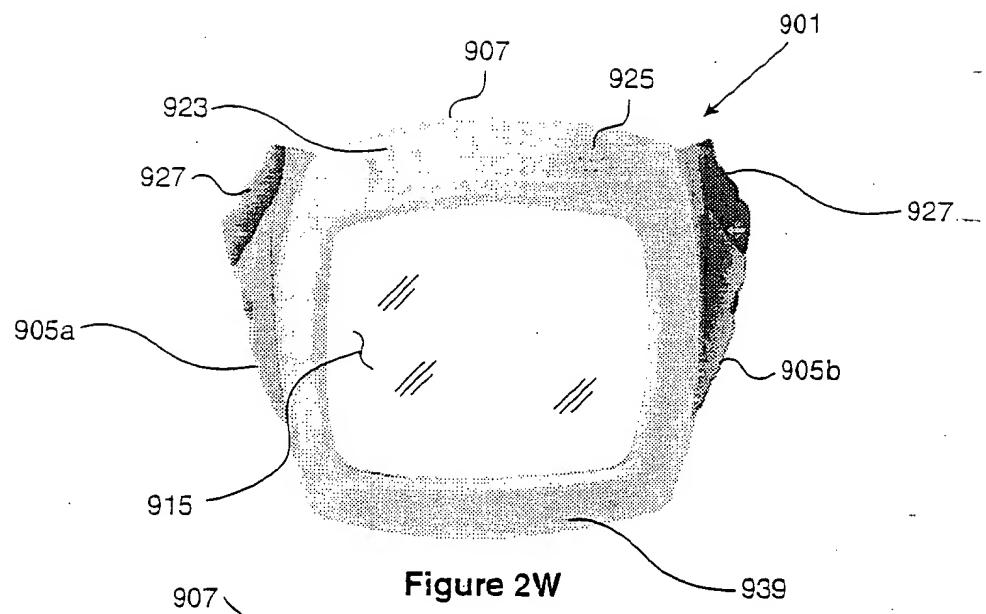


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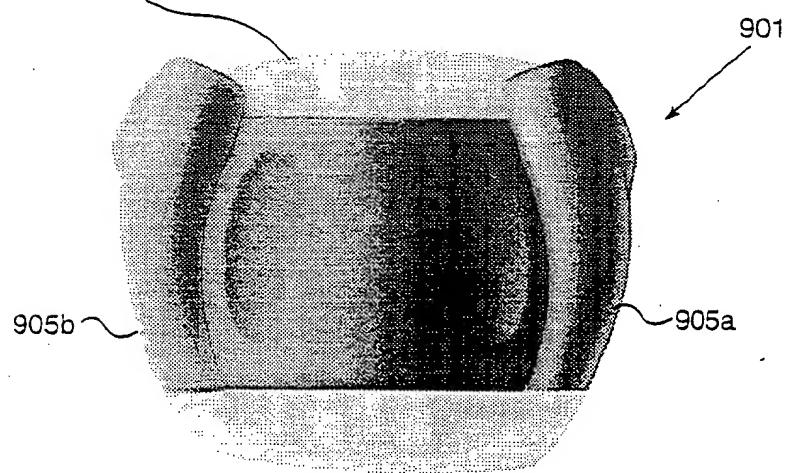


Figure 2X

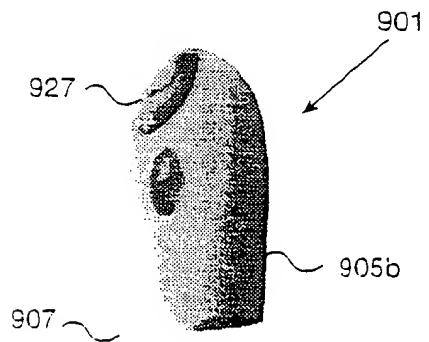
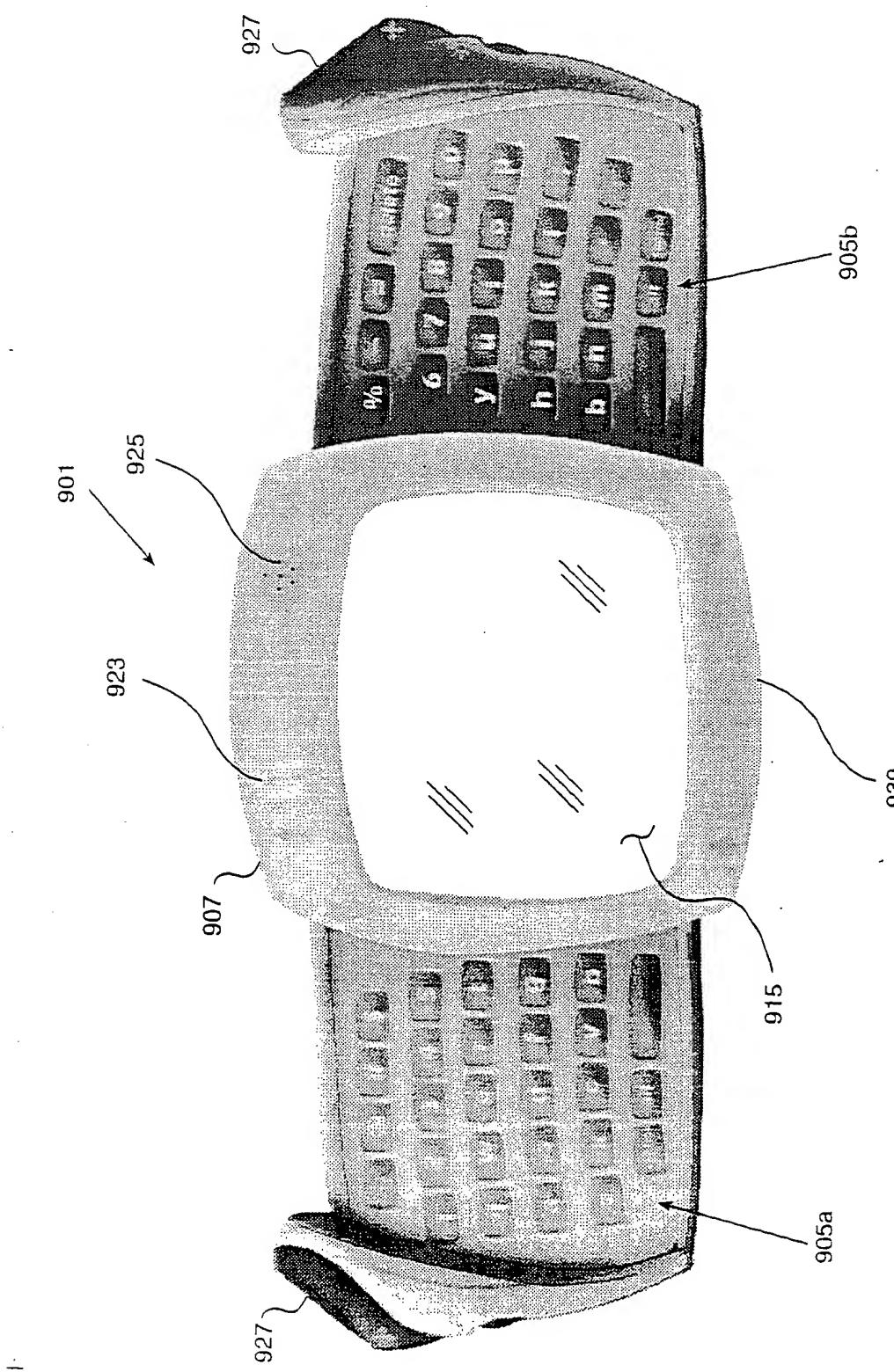


Figure 2Y

Figure 2Z



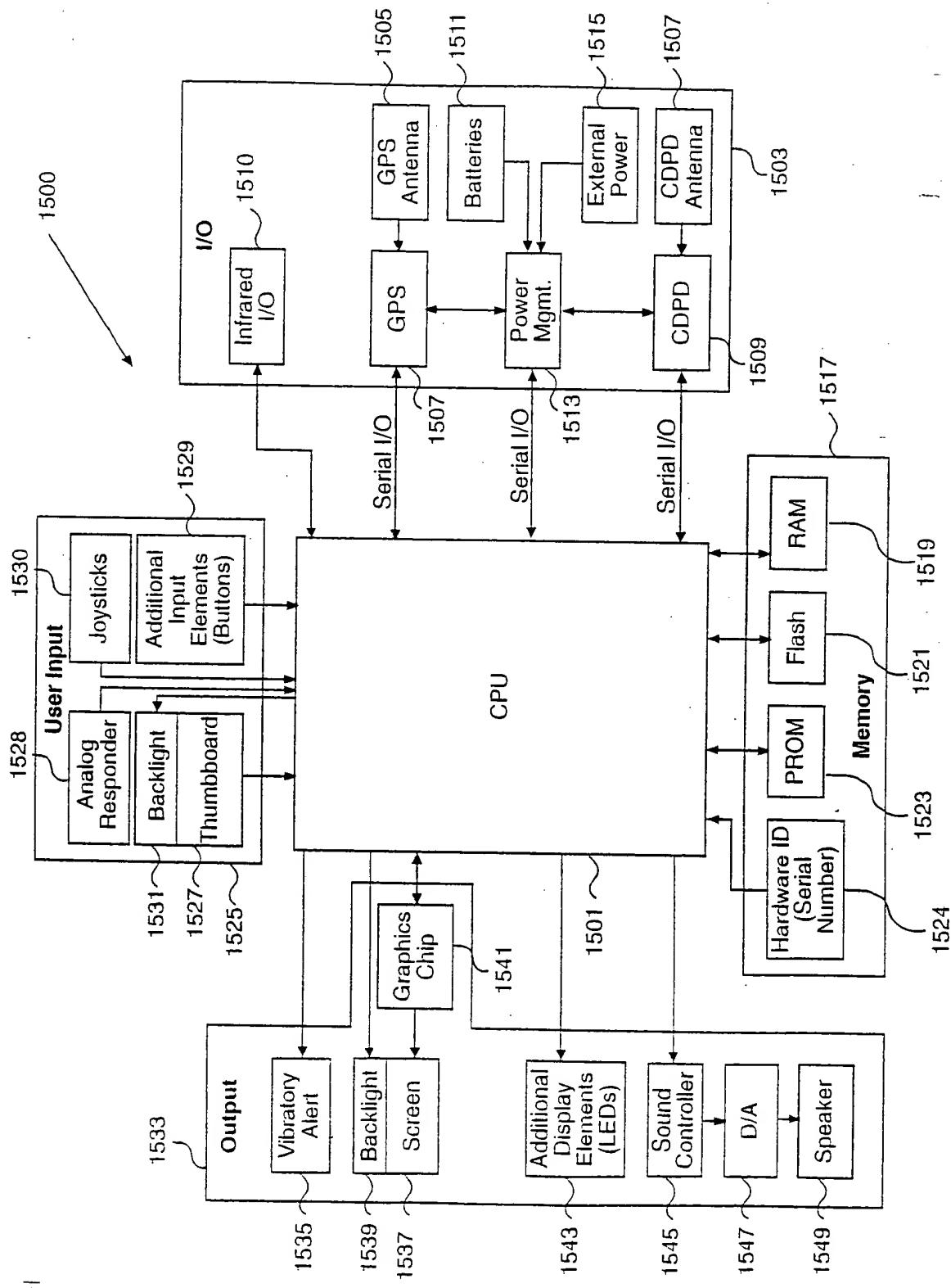


Figure 3A

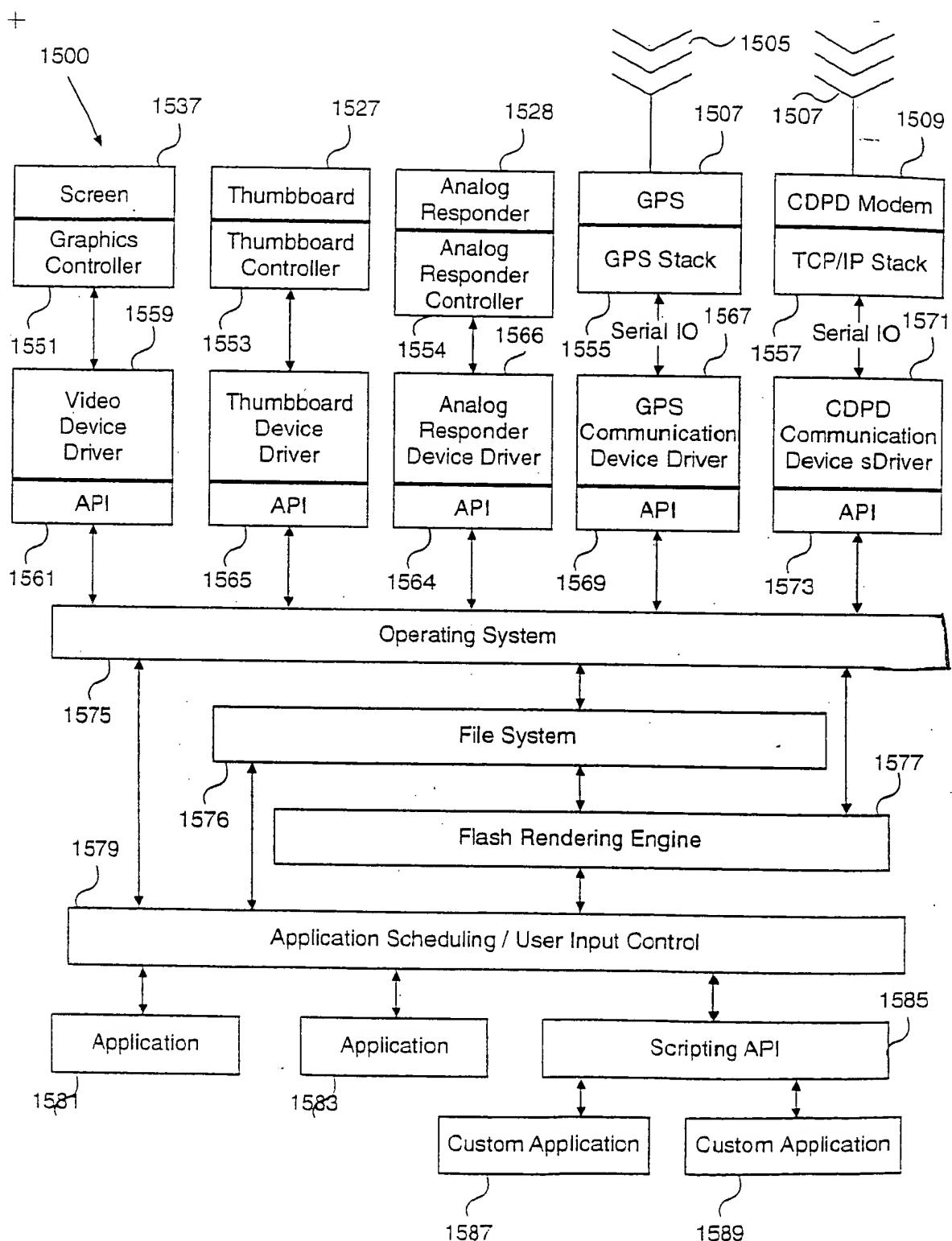


Figure 3B

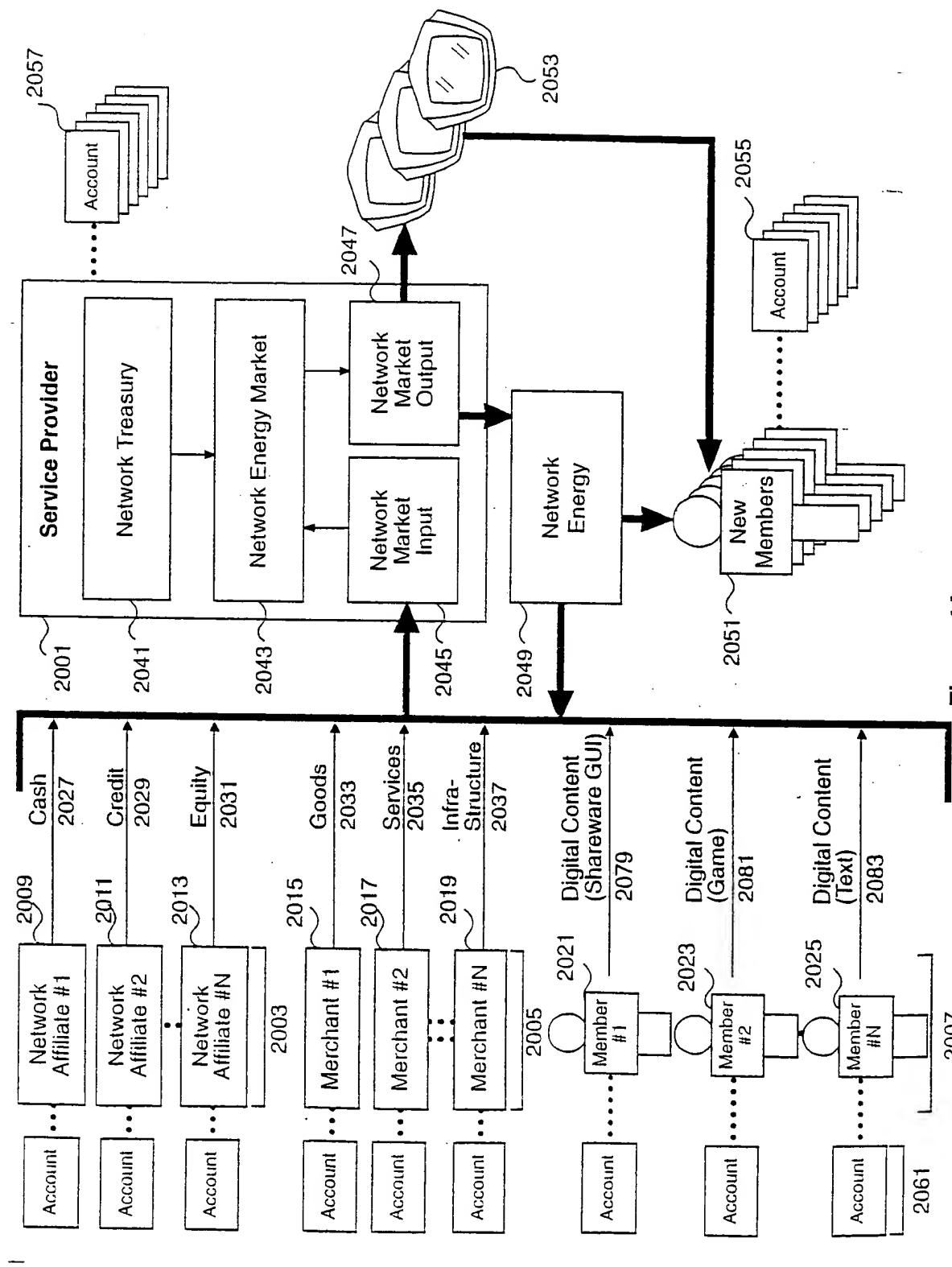


Figure 4A

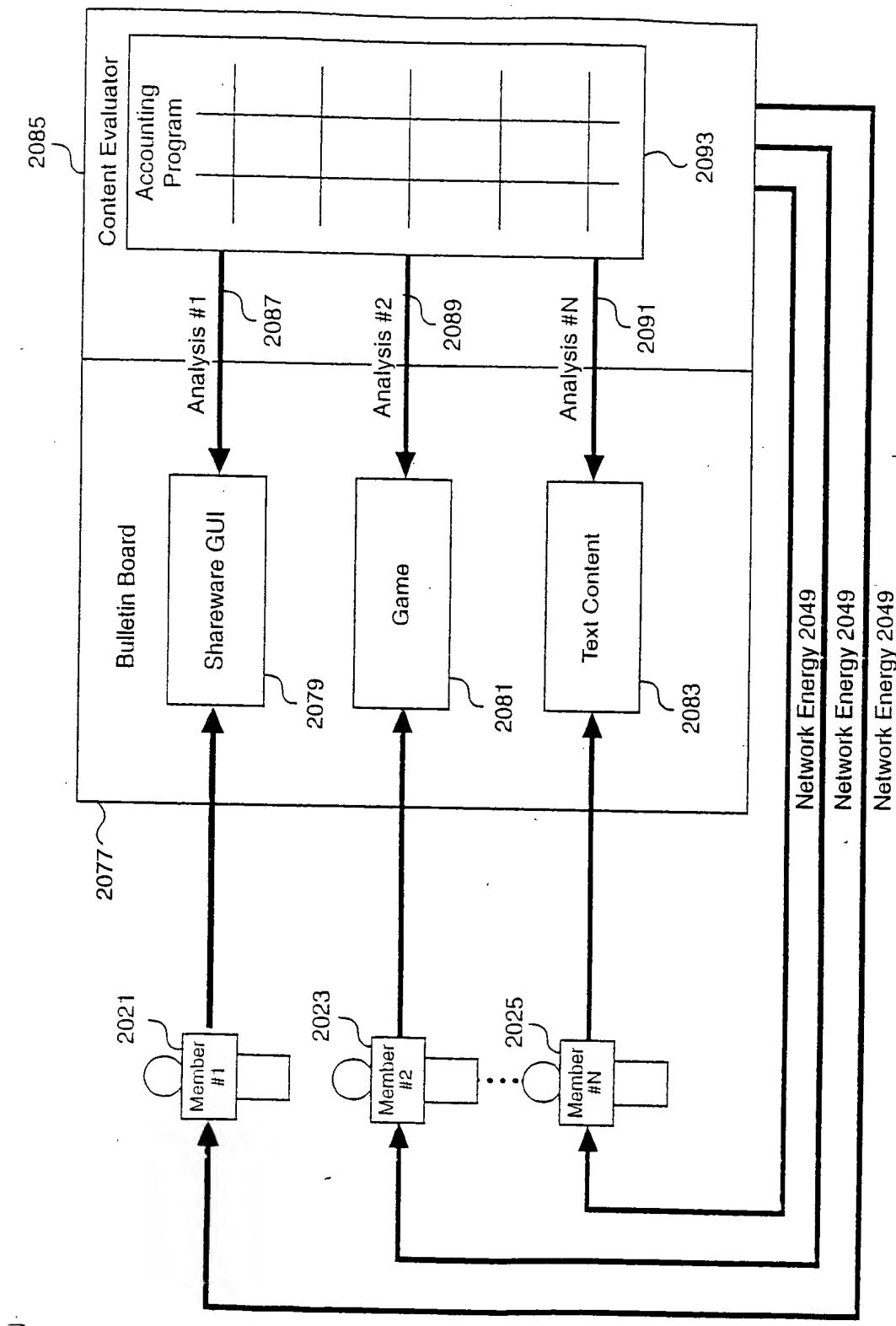


Figure 4B

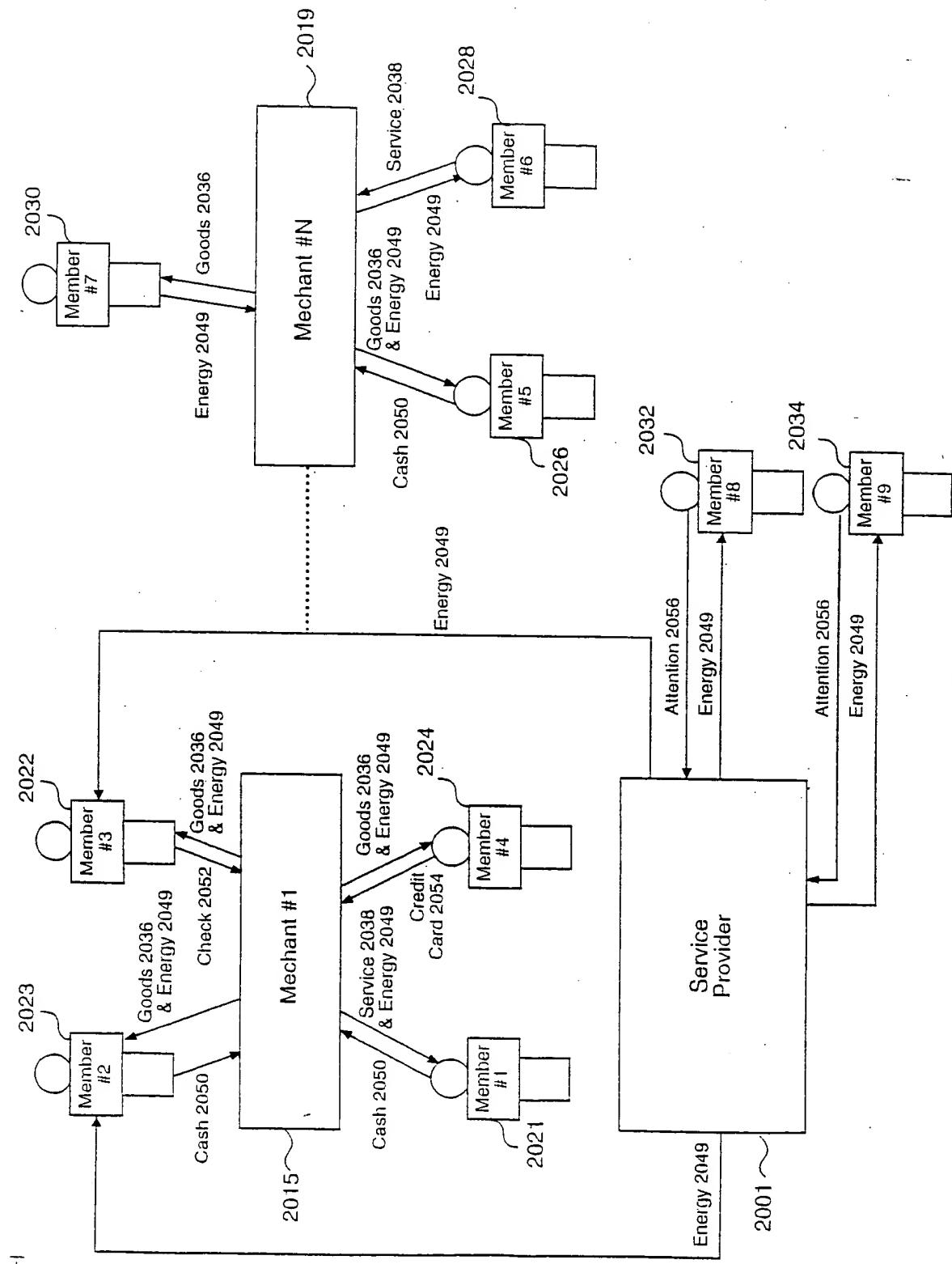
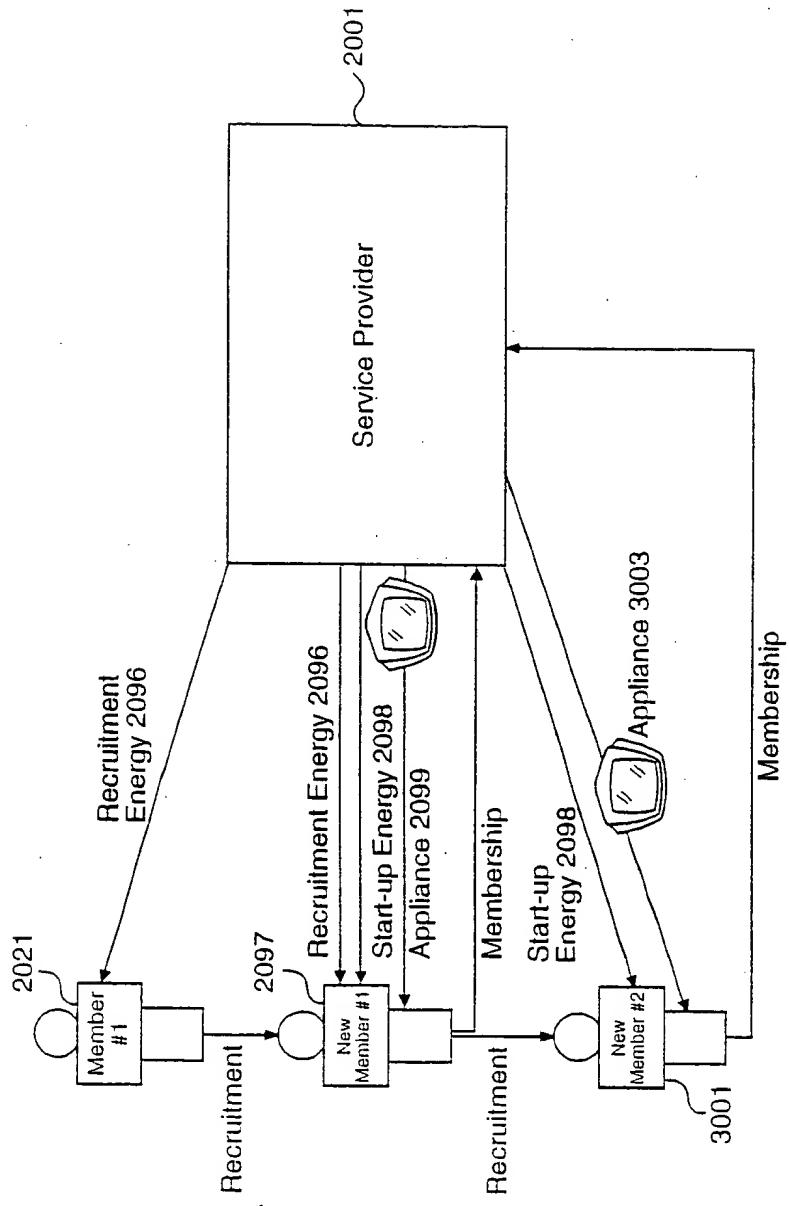


Figure 4C

Figure 4D



	Type of Input Element	Non-Biasing	Starting Position	Needs On-Screen Indicator	Continuous
3001	One-Dimensional Touch Pad	Yes	No	No	Yes
3013	Elongated Button	Yes	No	No	Yes
3015	Touch Screen with Graphical Slider	Yes	No	Yes	Yes
3017	Jog Wheel	No	Yes	Yes	Yes
3019	Scroll Wheel	No	No	Yes	Yes
3021	Thumb Wheel	No	No	Yes	Yes
3023	Linear Sliding Knob	No	Yes	No	Yes
3025	Touch Screen with Graphical Radio Buttons	Yes	No	Yes	No
3027	Dedicated Buttons on Keyboard	Yes	No	No	No
3029	Two-Dimensional Touch Pad	Yes	No	No	Yes
3031					
3003					
3007					
3009					
3011					

Figure 5A

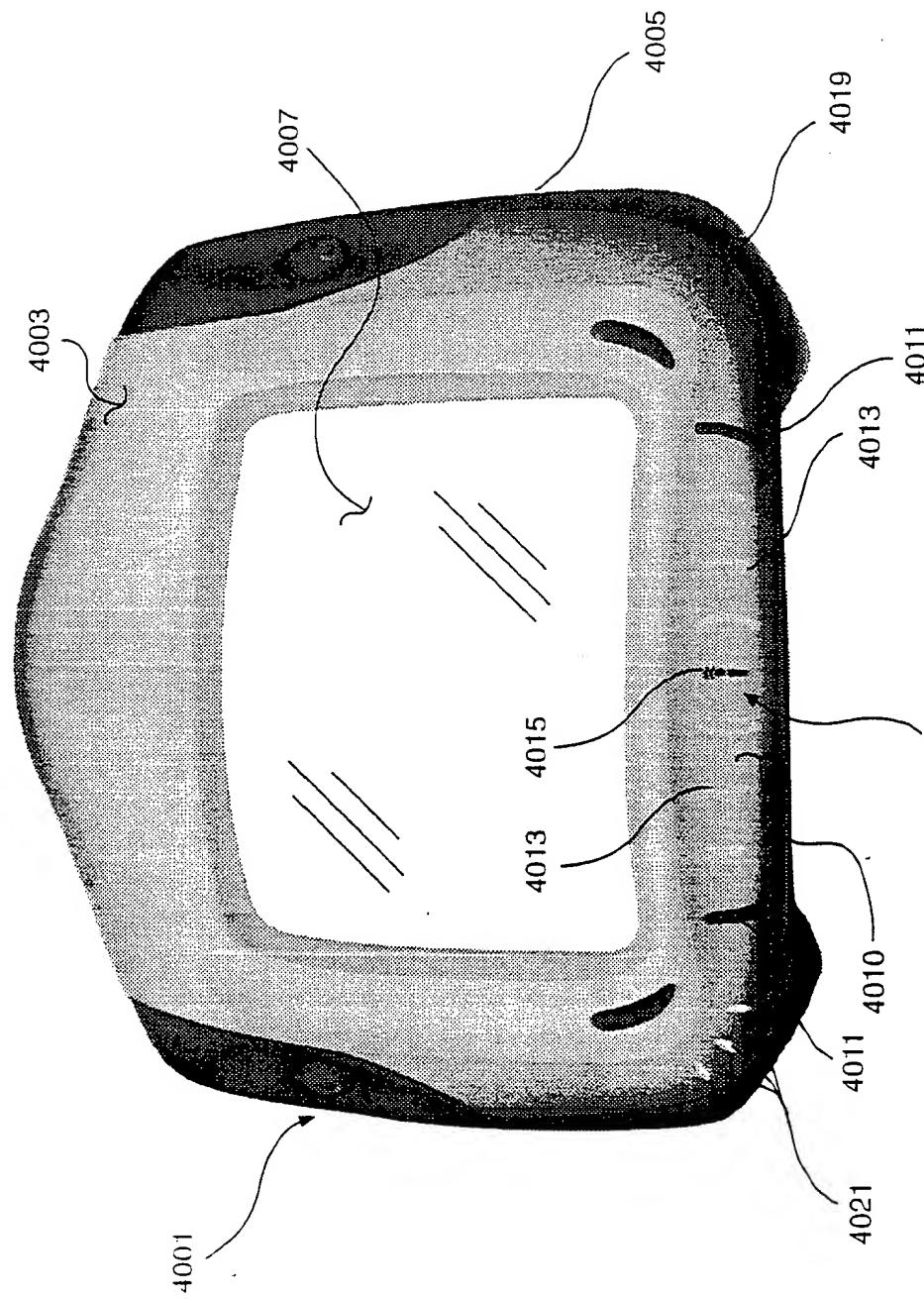


Figure 6A

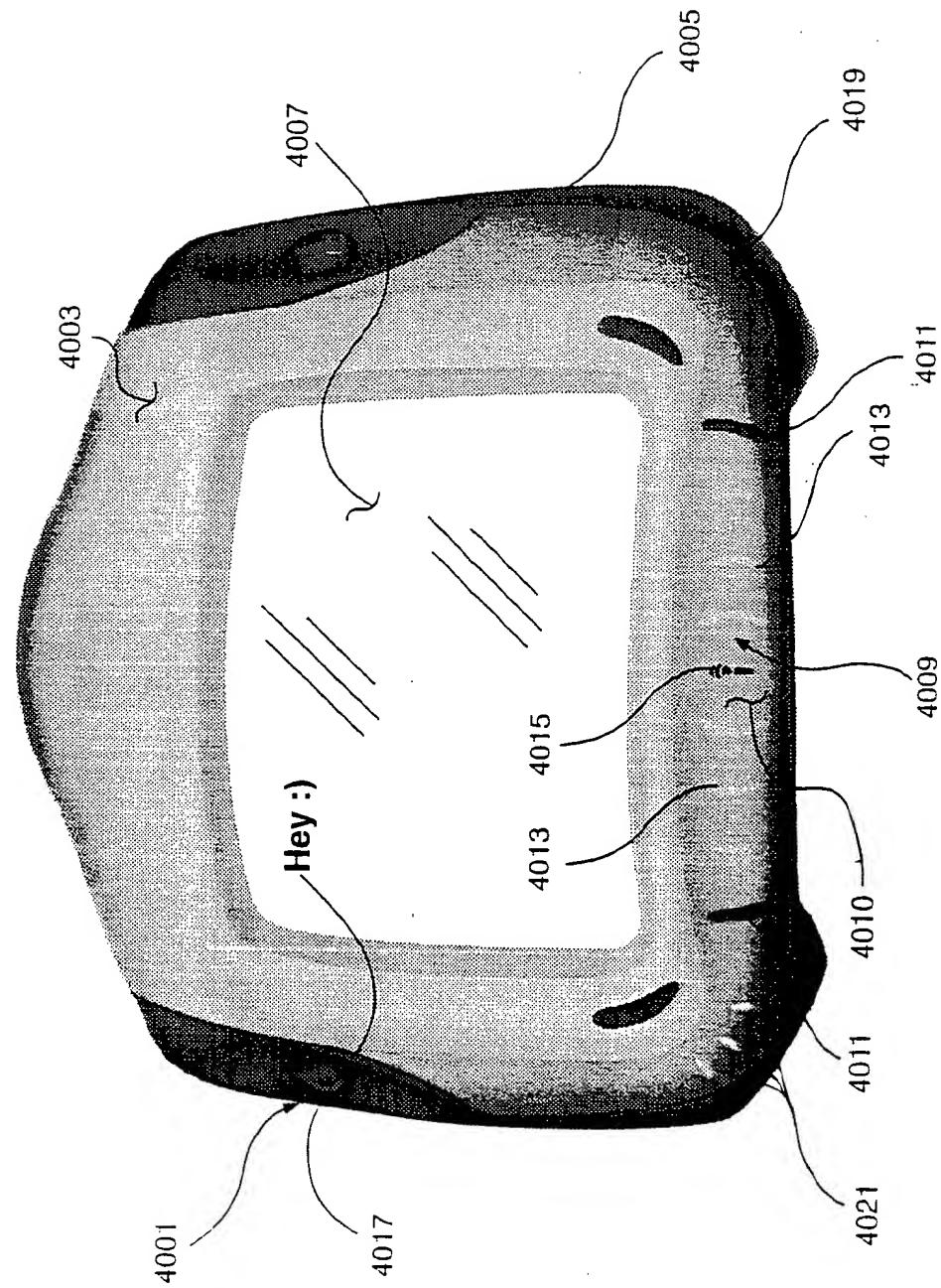


Figure 6B

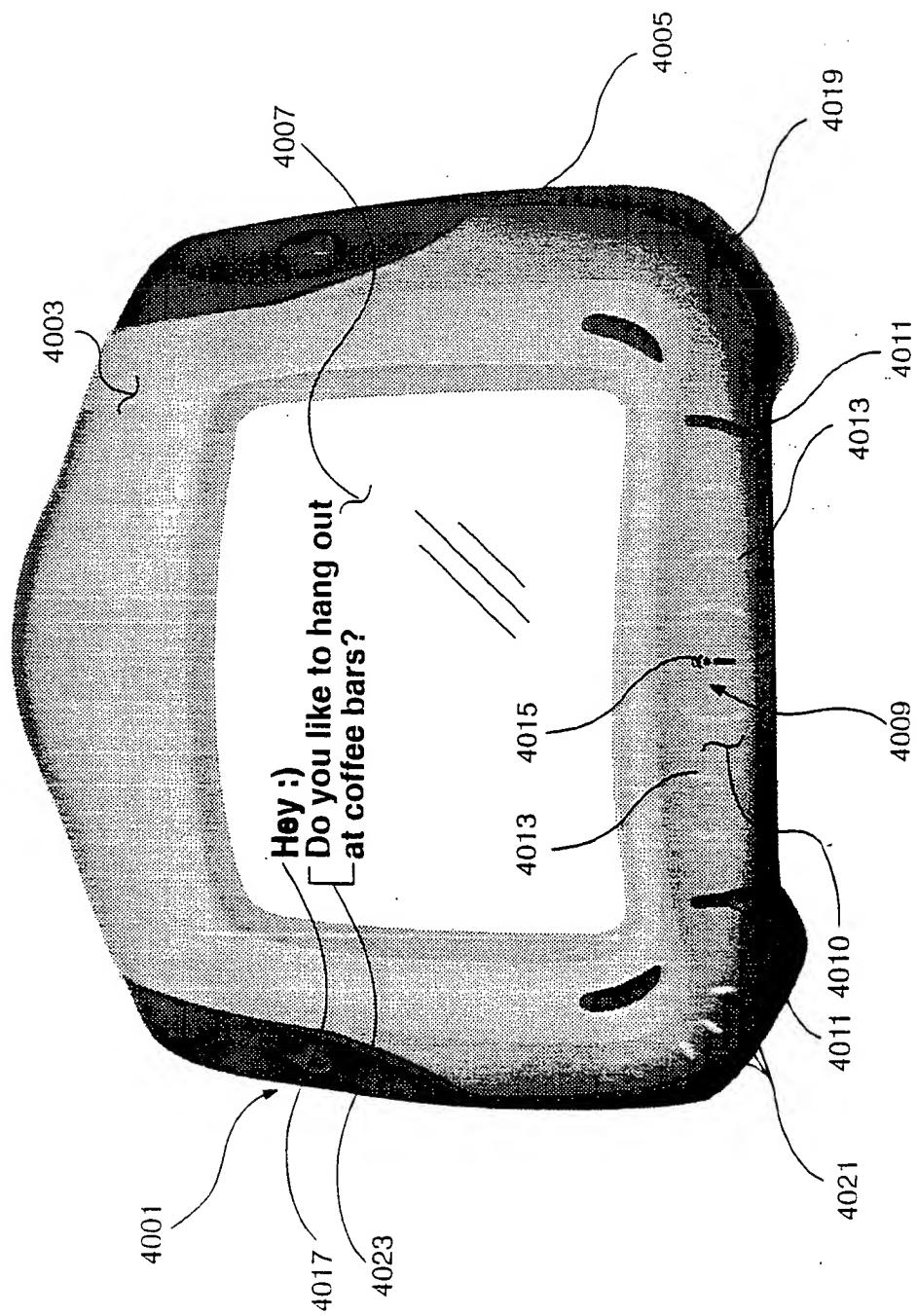


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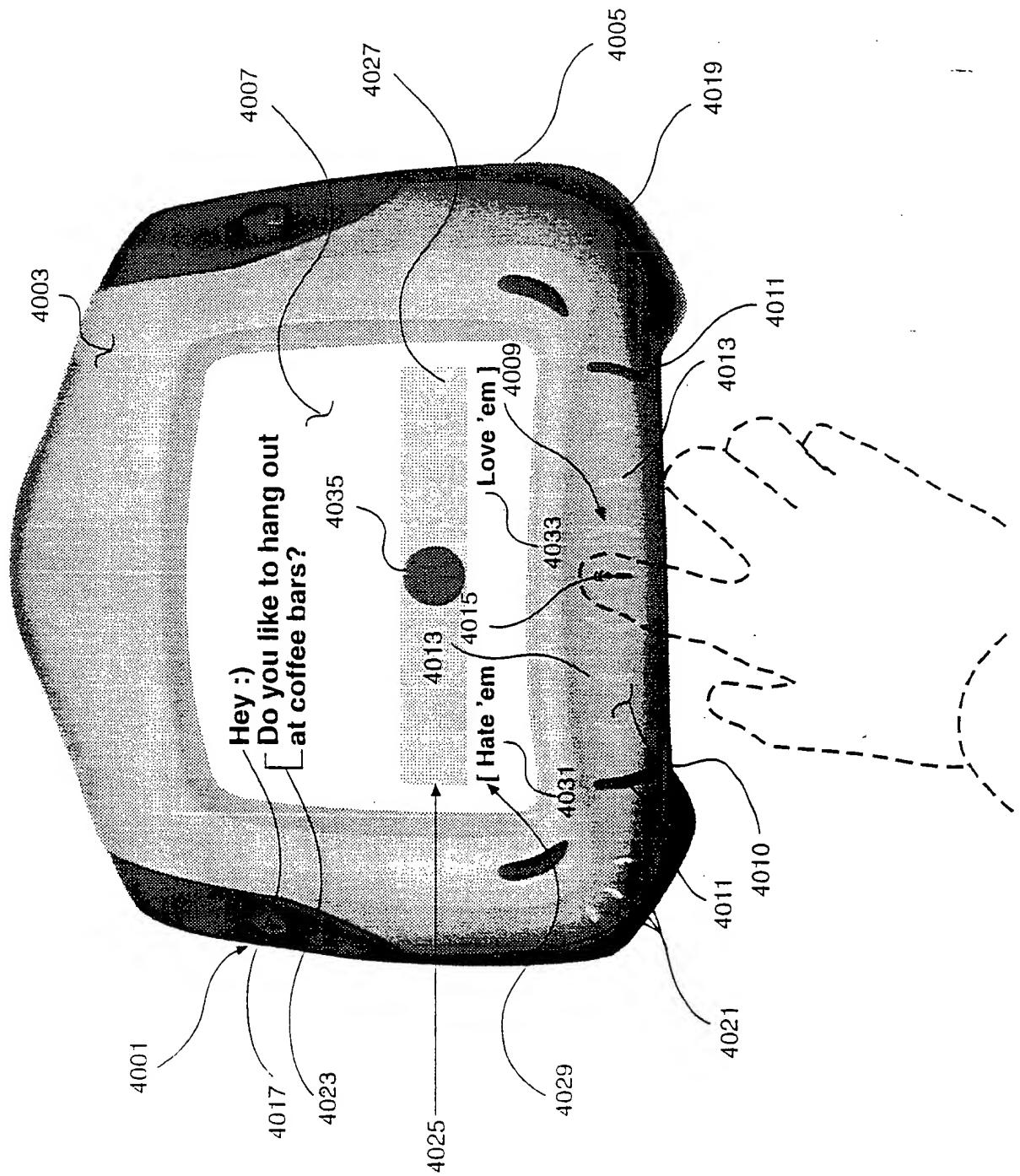


Figure 6D

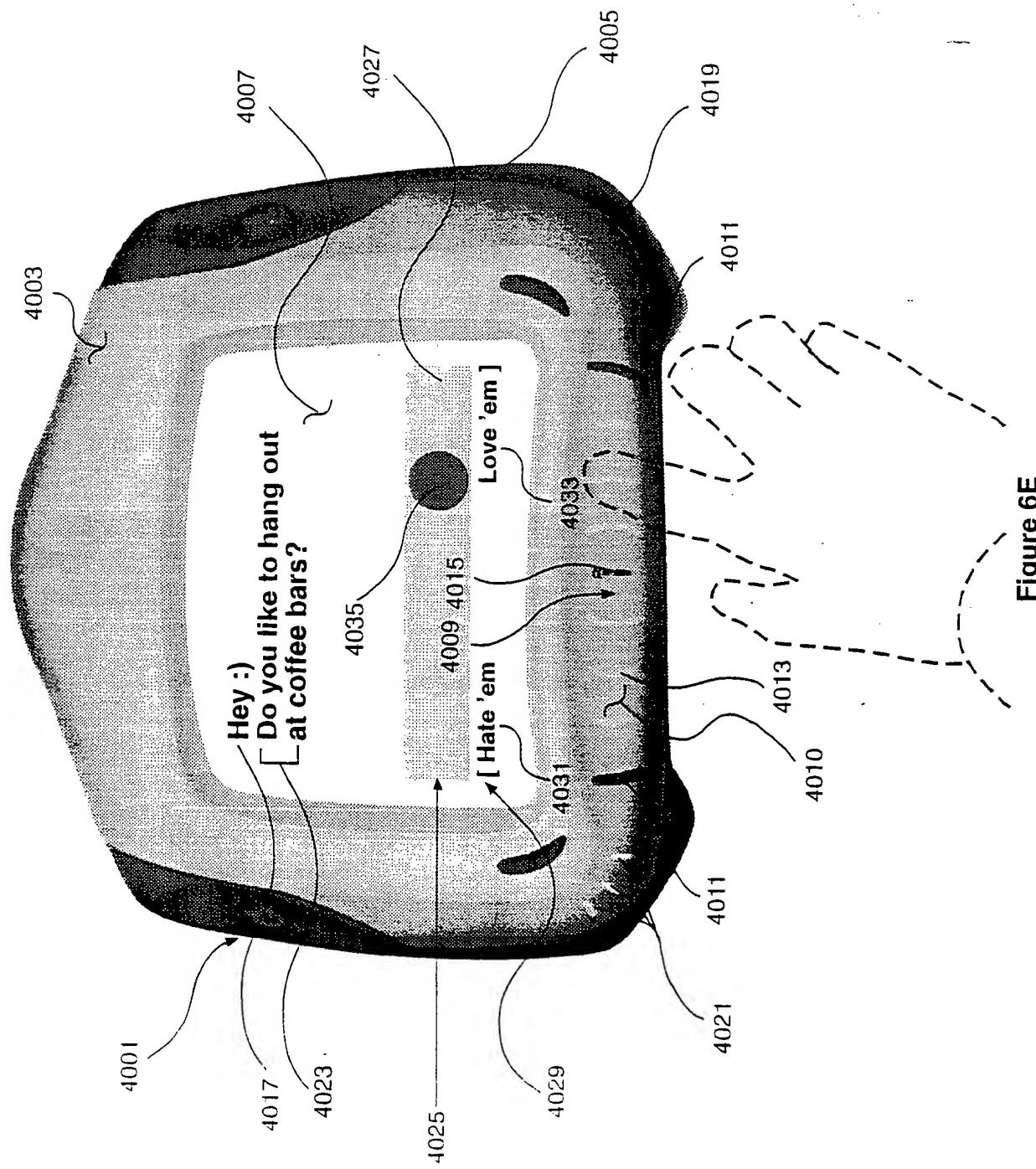


Figure 6E

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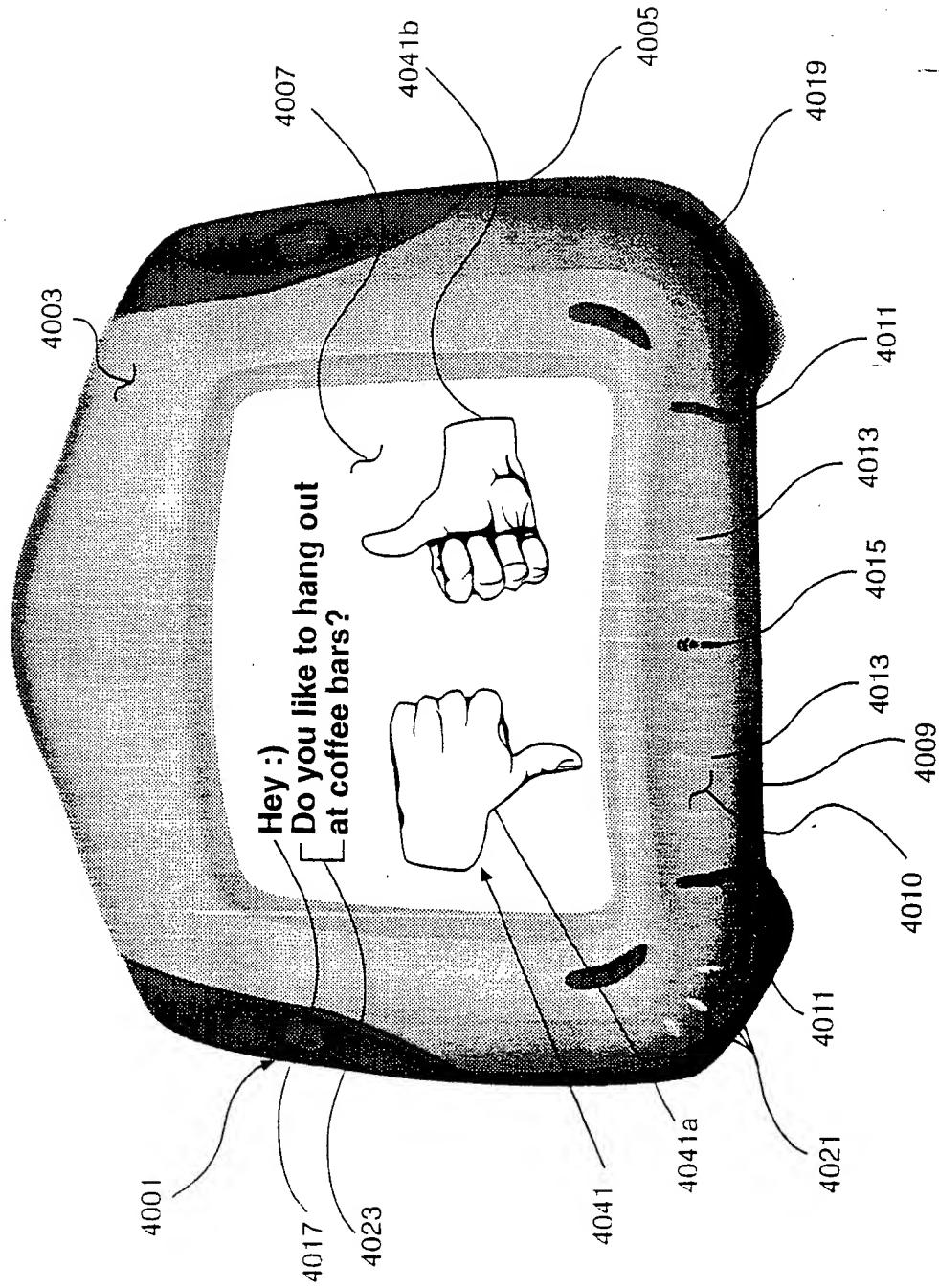
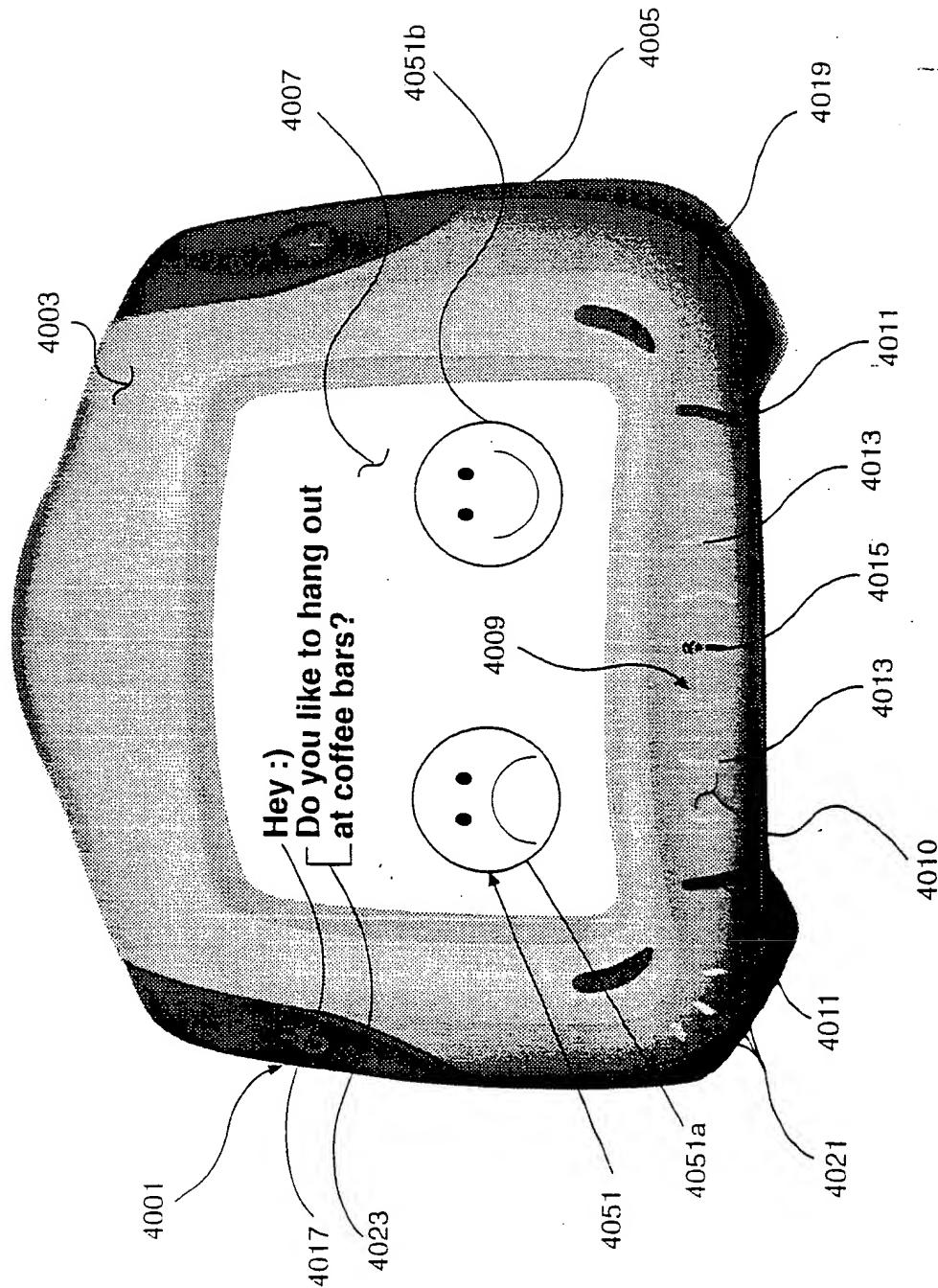


Figure 6F

20 30 40 50 60 70 80 90 100 110 120 130 140 150



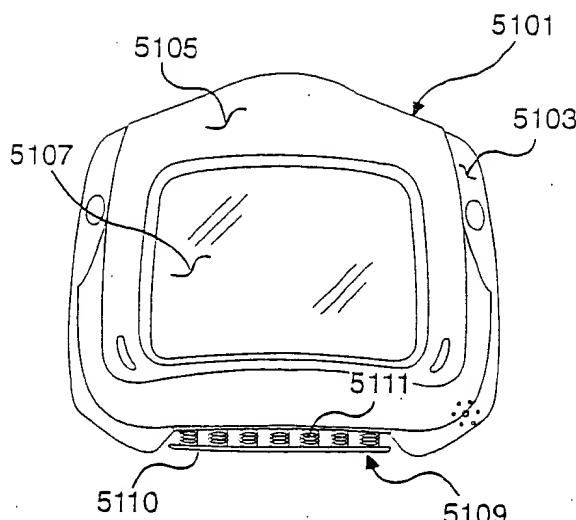


Figure 7A

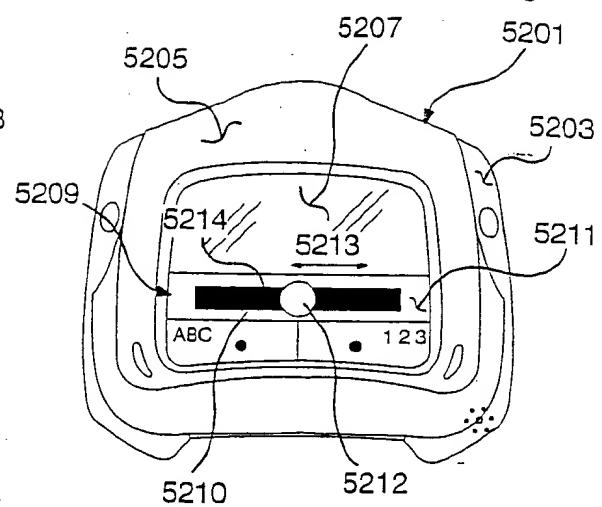


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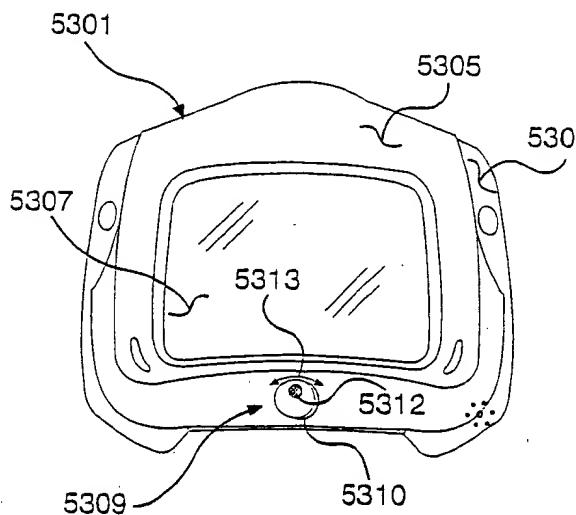


Figure 7C

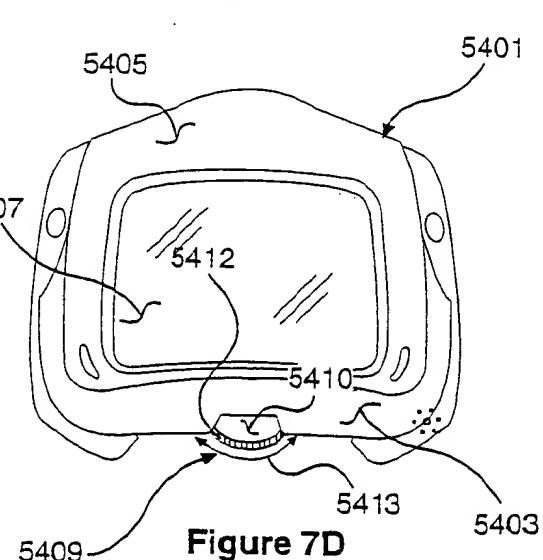


Figure 7D

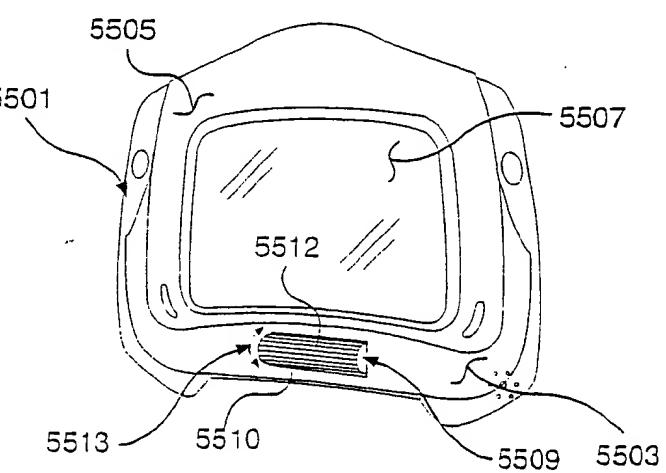


Figure 7E

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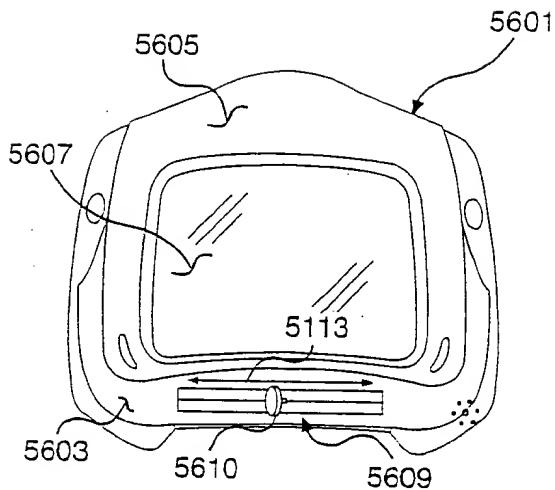


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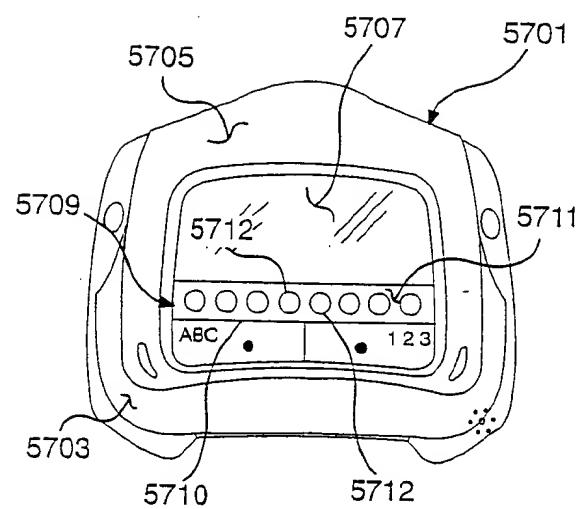


Figure 7G

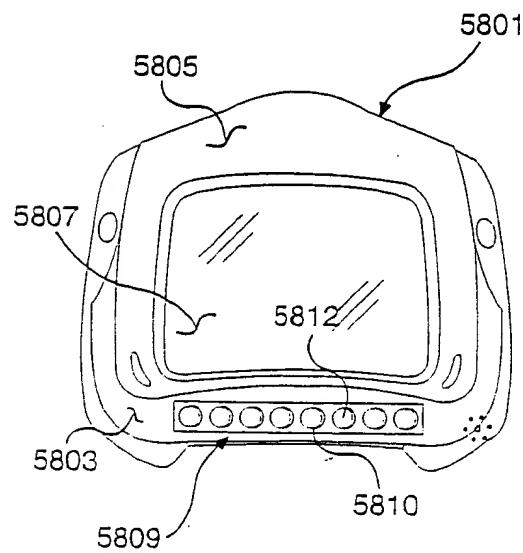


Figure 7H

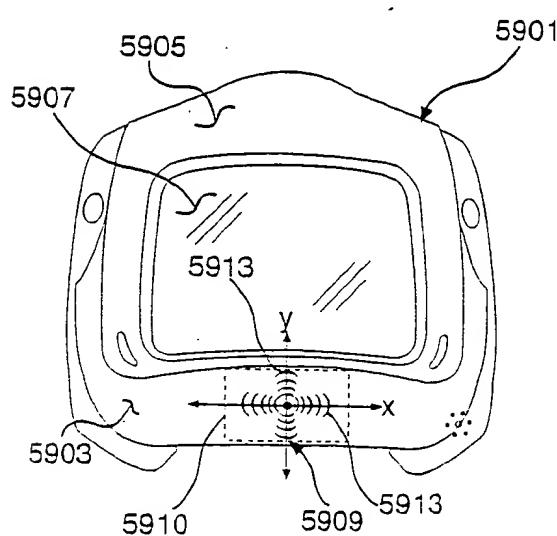


Figure 7I

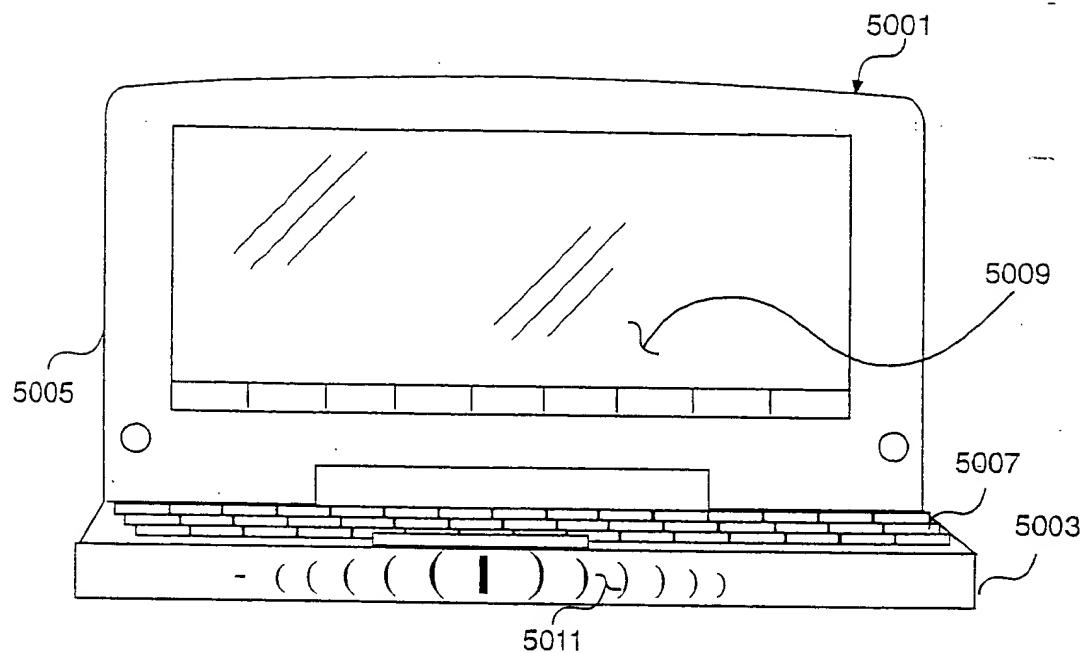


Figure 8A

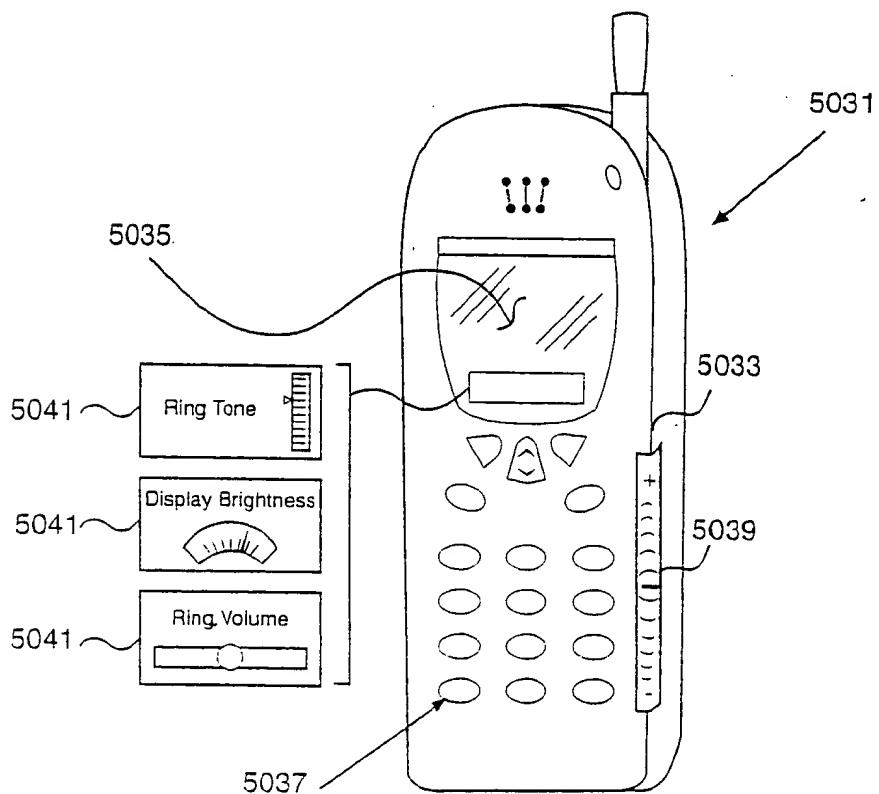


Figure 8B

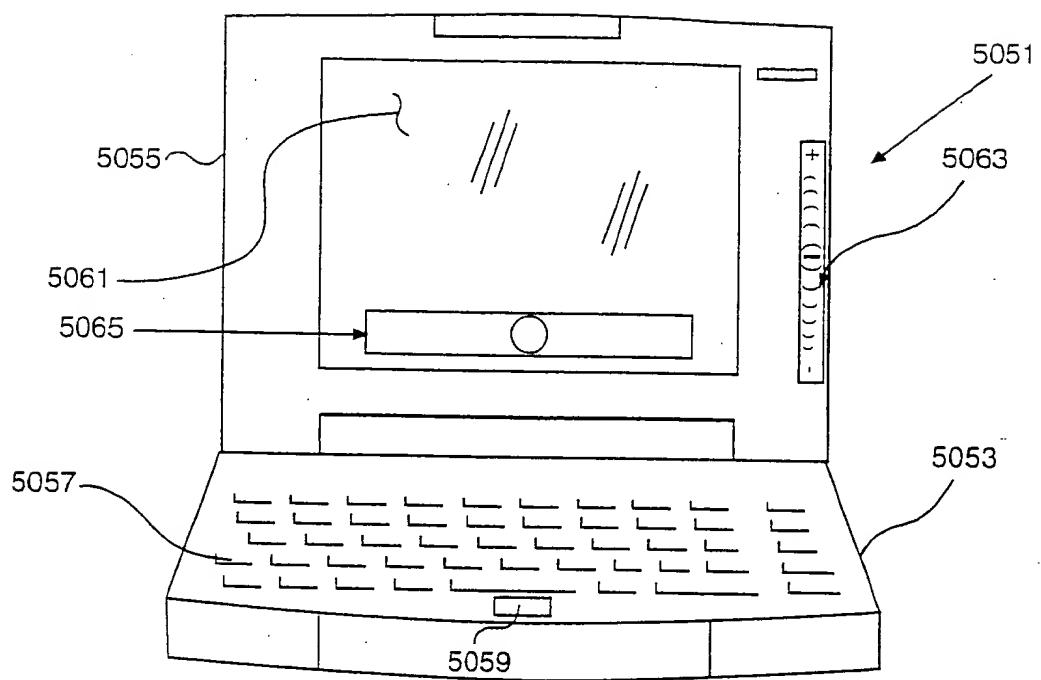


Figure 8C

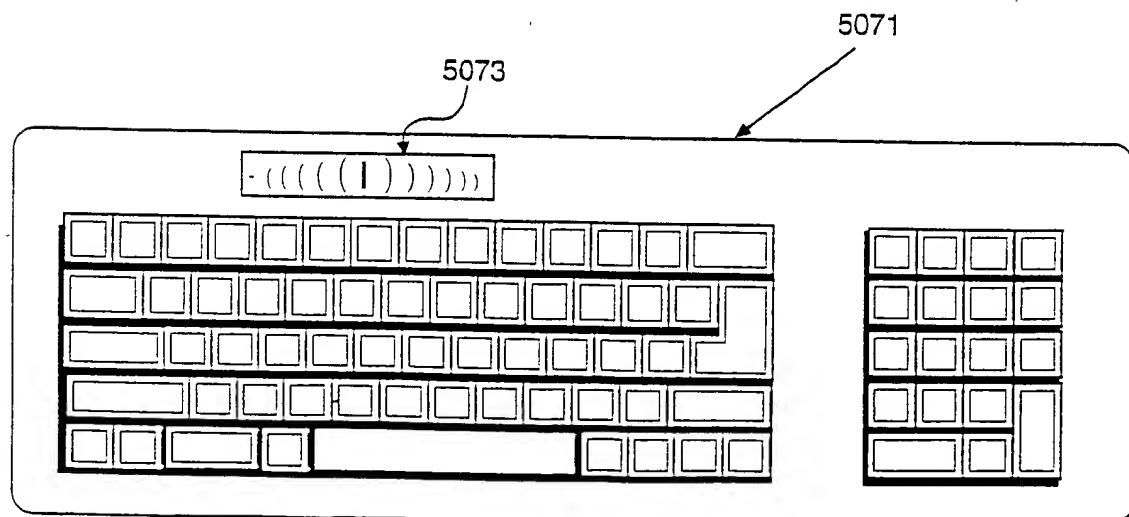


Figure 8D

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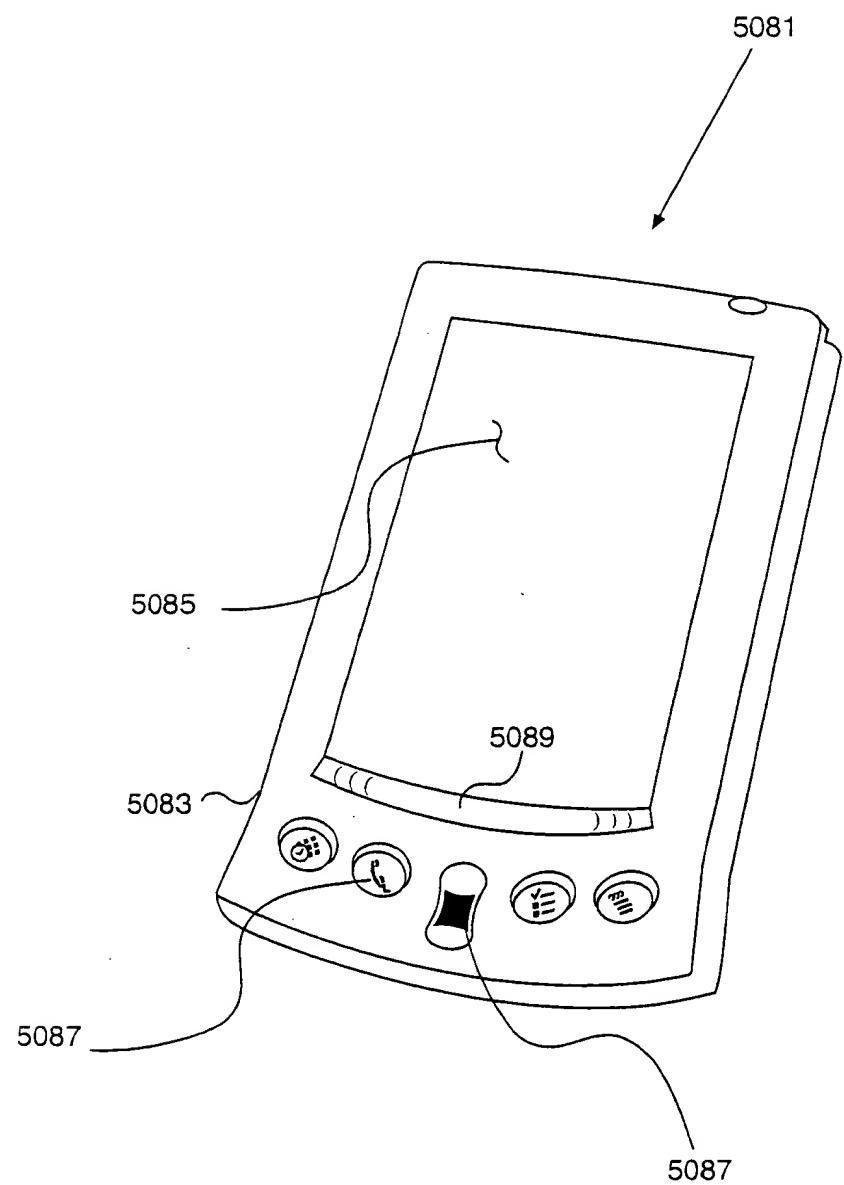


Figure 8E

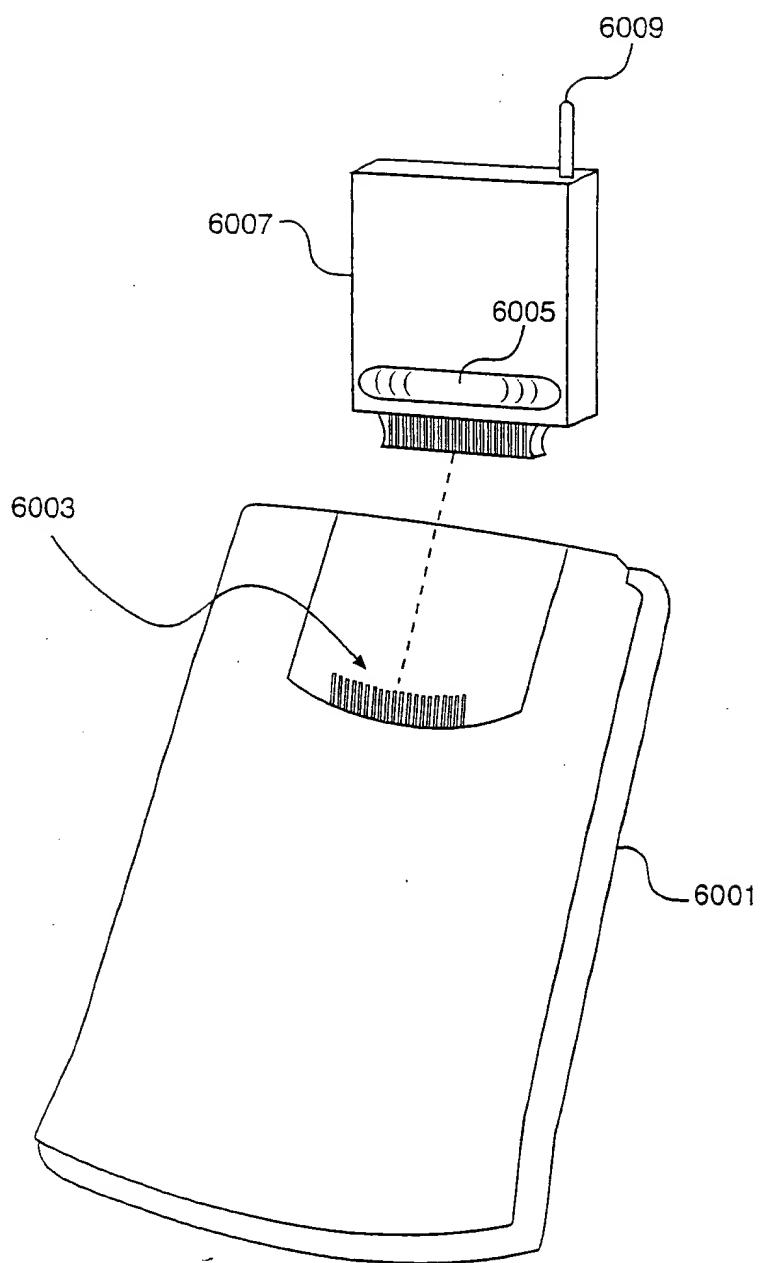


Figure 9

Age * Sex Crosstabulation

Age	Male	Female	Total
12	154	133	287
13	154	161	315
14	155	116	271
15	131	133	264
16	100	98	198
17	104	117	221
18	80	60	140
19	10	9	19
Total	888	827	1715

Fg 10A

Race * Sex Crosstabulation

Race		Male	Female	Total
White	N	783	714	1497
	%w/in race	52.30	47.70	100.00
Black	N	91	94	185
	%w/in race	49.19	50.81	100.00
Oriental	N	4	4	8
	%w/in race	50.00	50.00	100.00
American Indian	N	4		4
	%w/in race	100.00		100.00
Other	N	6	13	19
	%w/in race	31.58	68.42	100.00
Total	N	888	825	1713
	%w/in race	51.84	48.16	100.00

Fg 10B

Thumb Length

	N	Mean	Std Dev	1st	5th	50th	95th	99th
Total Males	292	6.3	0.7	5.0	5.3	6.3	7.3	8.1
Total Females	285	6.0	0.5	4.8	5.1	5.9	6.8	7.1
Males 12-15	196	6.1	0.6	5.0	5.2	6.1	7.1	7.8
Males 16-19	96	6.7	0.6	5.5	5.9	6.7	7.5	.
Females 12-15	198	5.9	0.5	4.7	5.0	5.9	6.8	7.0
Females 16-19	87	6.1	0.5	5.1	5.3	6.2	6.9	.

Fig. 10c

Thumb Length: Males

Age	N	Mean	Std Dev	Percentiles				
				1st	5th	50th	95th	99th
12	46	5.7	0.4	4.9	5.0	5.7	6.3	.
13	46	6.0	0.5	5.1	5.2	5.9	6.9	.
14	54	6.2	0.6	5.1	5.2	6.1	7.3	.
15	50	6.6	0.4	5.5	5.9	6.6	7.3	.
16	31	6.6	0.4	5.7	5.9	6.6	7.1	.
17	38	6.8	0.7	5.5	5.8	6.8	7.9	.
18	25	6.8	0.4	6.2	6.2	6.9	7.5	.
19	2	7.6	0.8	7.0	7.0	7.6	.	.

Fig. 10d

Thumb Length: Females

Age	Valid N	Mean	Std Dev	Percentiles				
				1st	5th	50th	95th	99th
12	48	5.7	0.5	4.7	4.9	5.8	6.5	.
13	61	5.9	0.5	4.6	4.9	5.8	6.6	.
14	44	5.9	0.5	4.8	5.0	5.9	6.9	.
15	45	6.1	0.4	5.4	5.4	6.0	6.9	.
16	25	6.2	0.5	5.1	5.2	6.3	7.1	.
17	42	6.0	0.5	5.1	5.2	6.0	7.0	.
18	16	6.2	0.3	5.7	5.7	6.2	.	.
19	4	6.1	0.3	5.7	5.7	6.1	.	.

Fig. 10e

20 25 30 35 40 45 50 55 60

Fig 10F

Correlations: Total

		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.770
	Sig. (2-tailed)**	.	0.000
	N	577	576
HAND LENGTH	Pearson Correlation	0.770	1
	Sig. (2-tailed)**	0.000	.
	N	576	1707

** Correlation is significant at the 0.01 level (2-tailed)**.

Fig 10G

Correlations: Male

		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.790
	Sig. (2-tailed)**	.	0.000
	N	292	291
HAND LENGTH	Pearson Correlation	0.790	1
	Sig. (2-tailed)**	0.000	.
	N	291	882

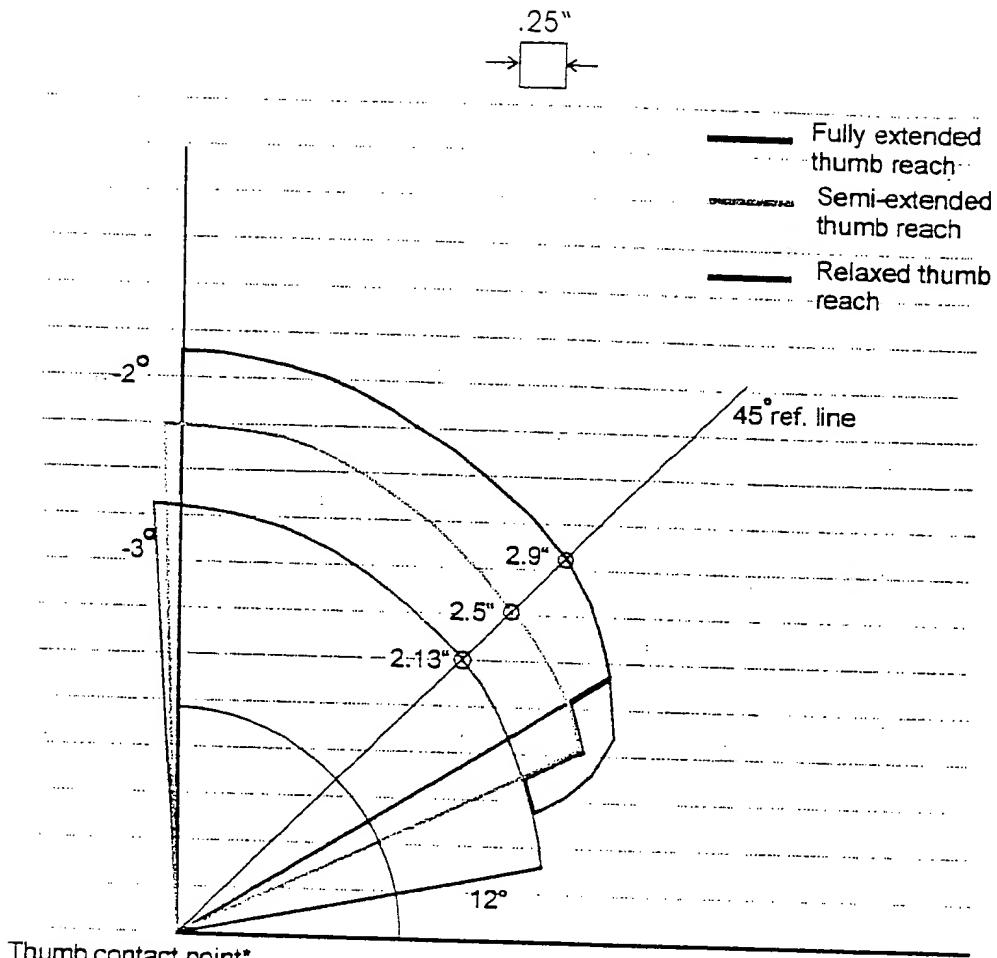
** Correlation is significant at the 0.01 level (2-tailed)**.

Correlations: Female

		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.657
	Sig. (2-tailed)**	.	0.000
	N	285	285
HAND LENGTH	Pearson Correlation	0.657	1
	Sig. (2-tailed)**	0.000	.
	N	285	825

** Correlation is significant at the 0.01 level (2-tailed)**.

Fig 10H



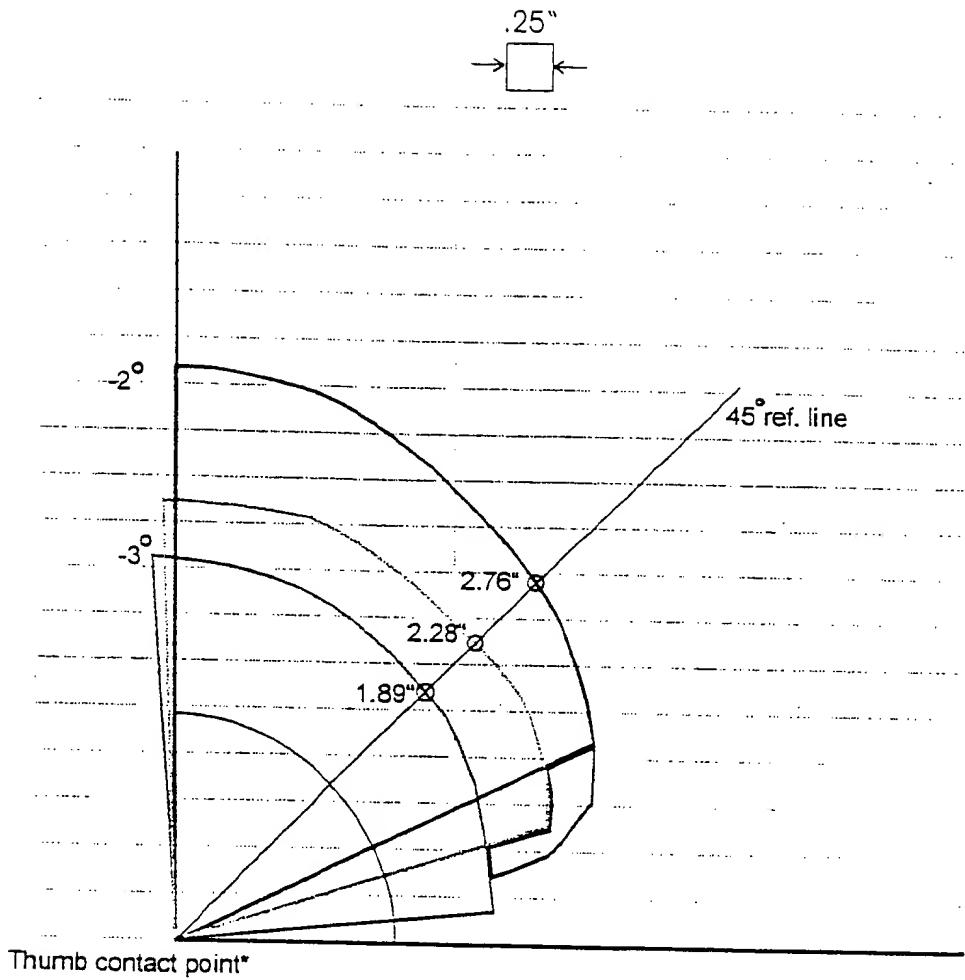
1st Percentile Left Thumb Sweeps, Females Age 12-19
 (Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

* Located vertically over point of thumb base contact with corner,
 at midpoint of lower corner radius on device

Fig 10.I

C23

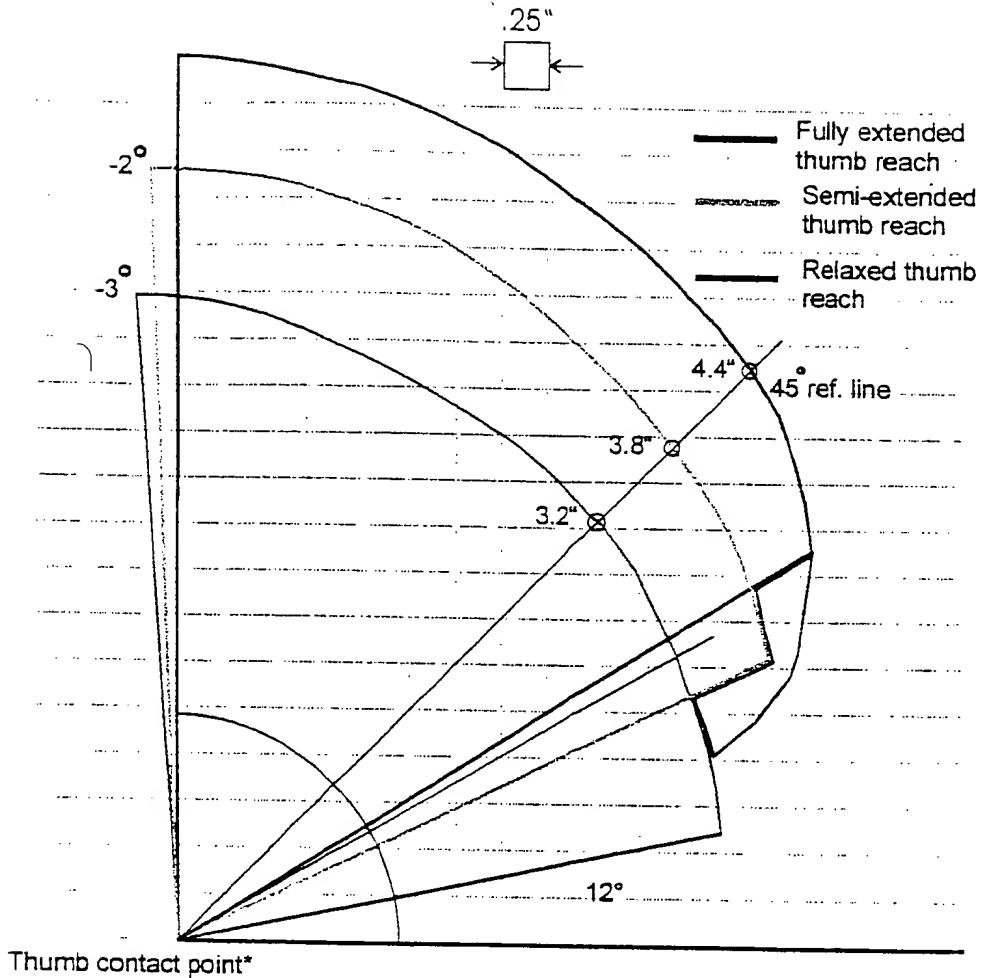


1st Percentile Left Thumb Sweeps, Females Age 12-19
(Uniform object thickness 0.75", corner radius 0.75")

* Located vertically over point of thumb base contact with corner,
at midpoint of lower corner radius on device

Fig 10 J

C24



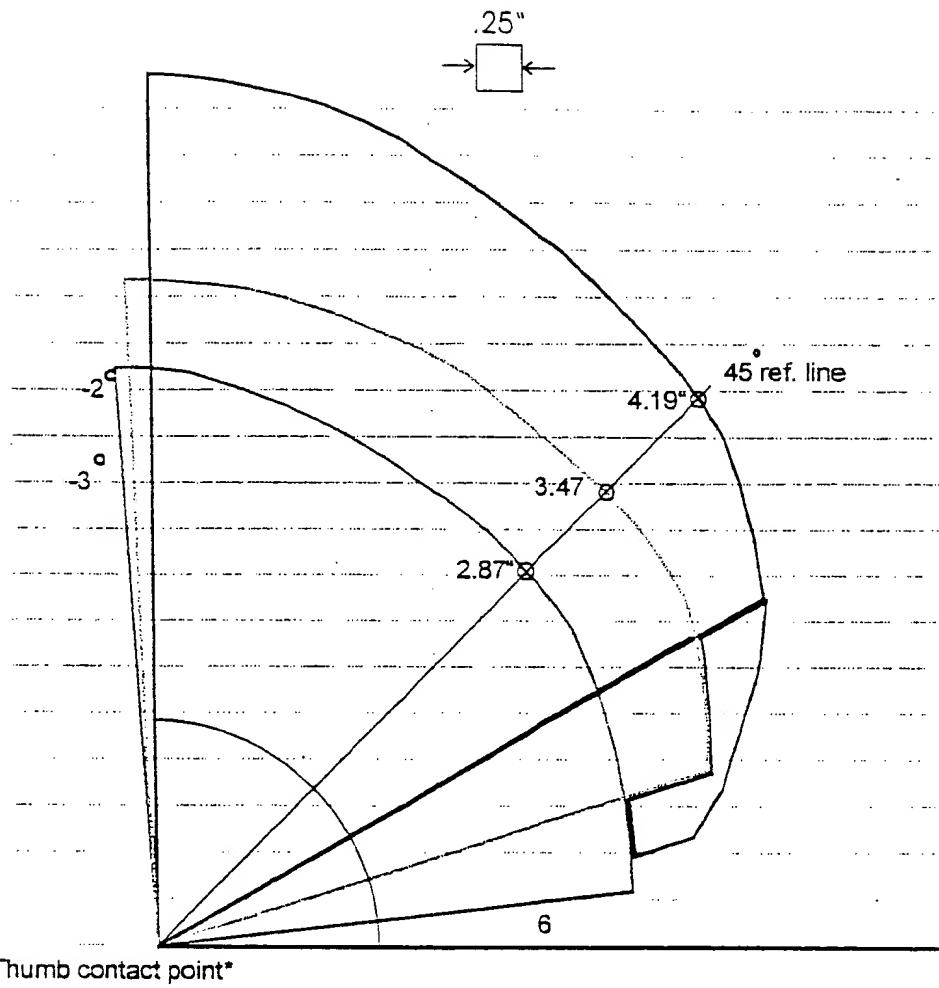
95th Percentile Left Thumb Sweeps, Male Age 12-19
 (Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

* Located vertically over point of thumb base contact with corner,
 at midpoint of lower corner radius on device

Fg 10K

C25

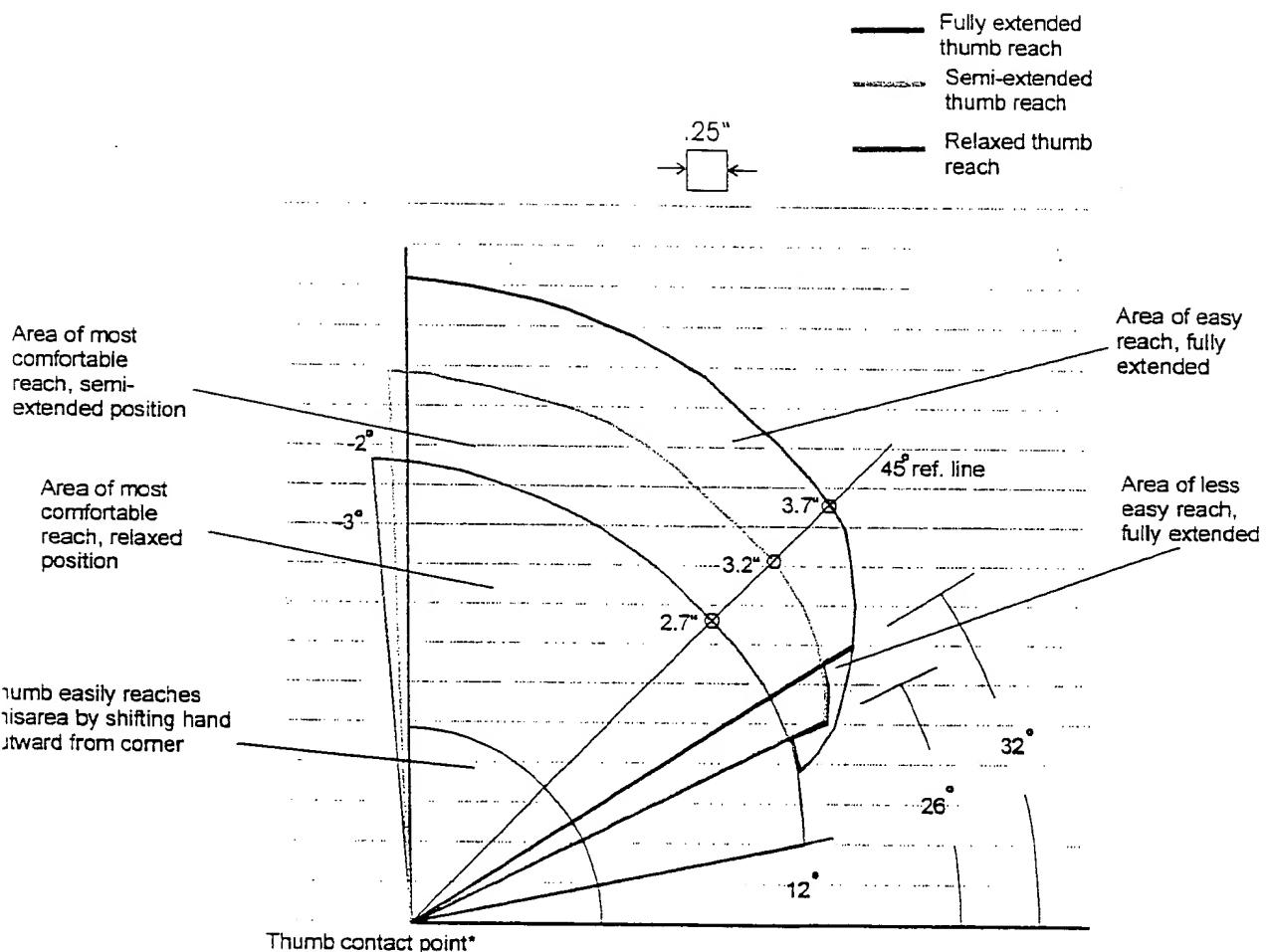


95th Percentile Left Thumb Sweeps, Male Age 12-19
(Uniform object thickness 0.75", corner radius 0.75")

* Located vertically over point of thumb base contact with corner,
at midpoint of lower corner radius on device

Fig 10L

C26



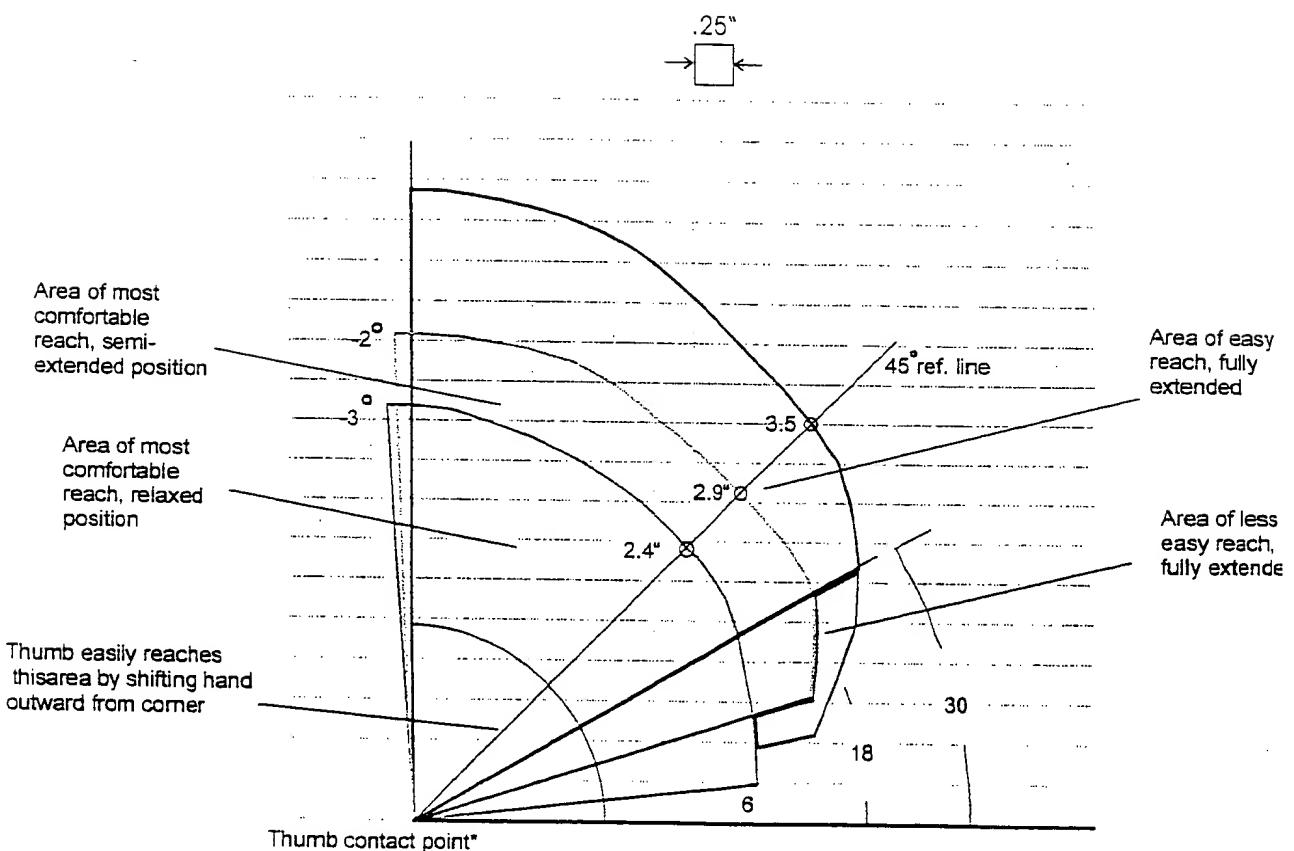
50th Percentile Left Thumb Sweeps, M+F Age 12-19
(Uniform object thickness 0.75", corner radius 1.5")

Note: Each data point represents thumb tip at centerline of thumb

* Located vertically over point of thumb base contact with corner,
at midpoint of lower corner radius on device

Fig. 10M

C27



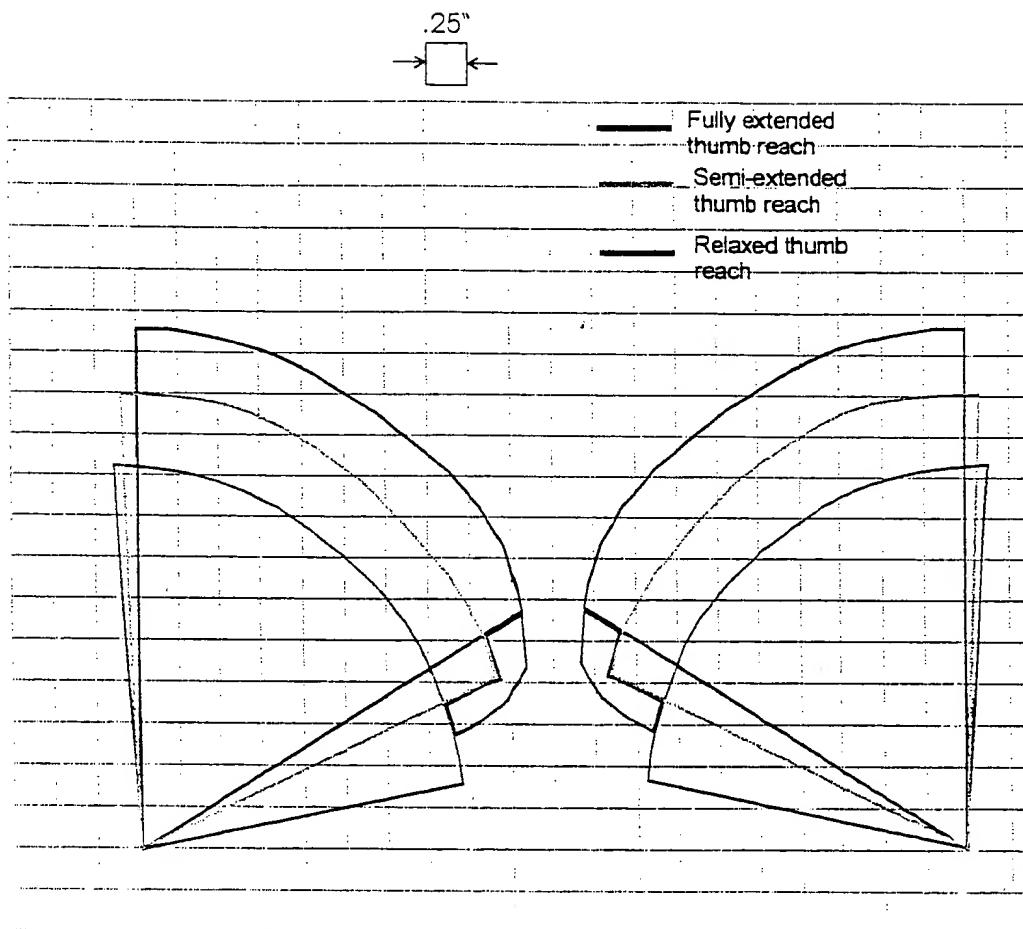
50th Percentile Left Thumb Sweeps, M+F Age 12-19
(Uniform object thickness 0.75", corner radius 0.75")

* Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device

Fig 10N

C 28

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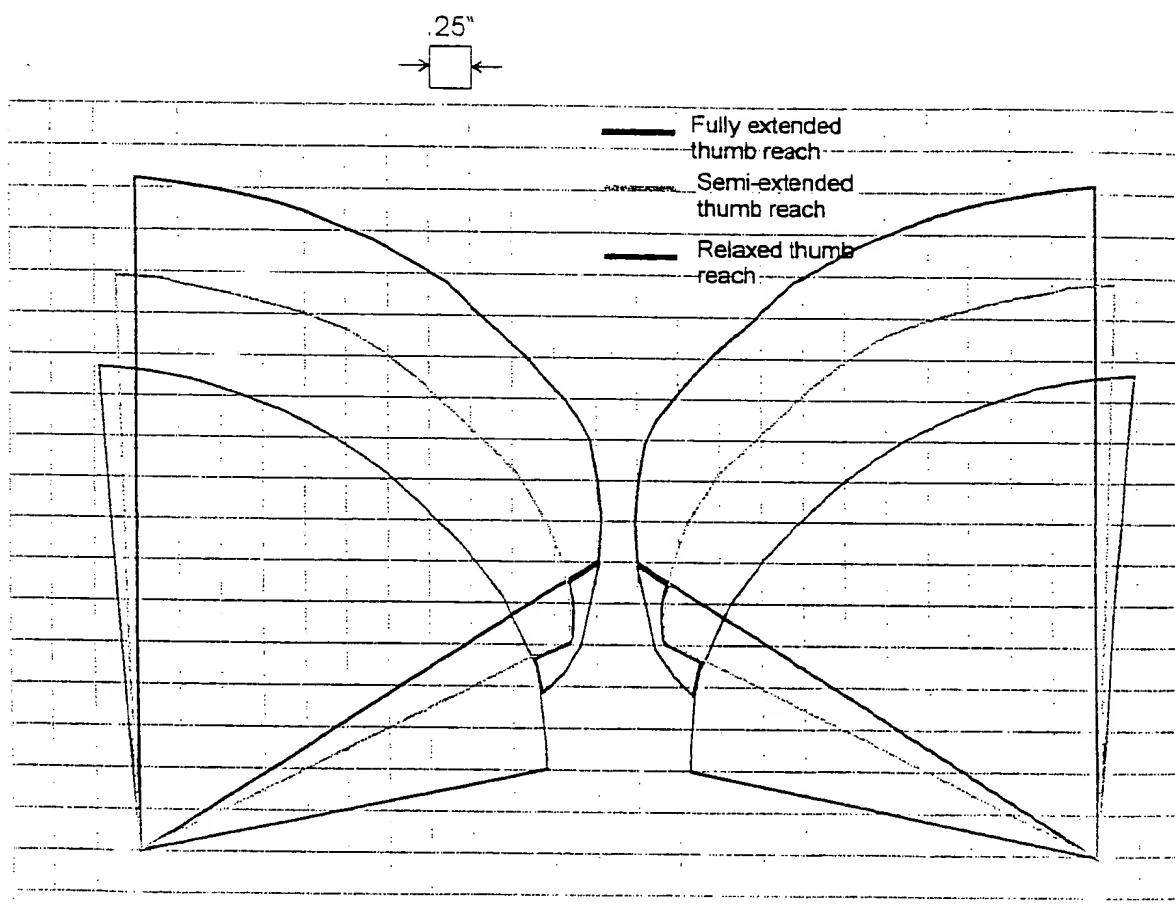
1st Percentile Combined Thumb Sweeps, Females Age 12-19 (Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

* Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device.

Fig 10C

c29



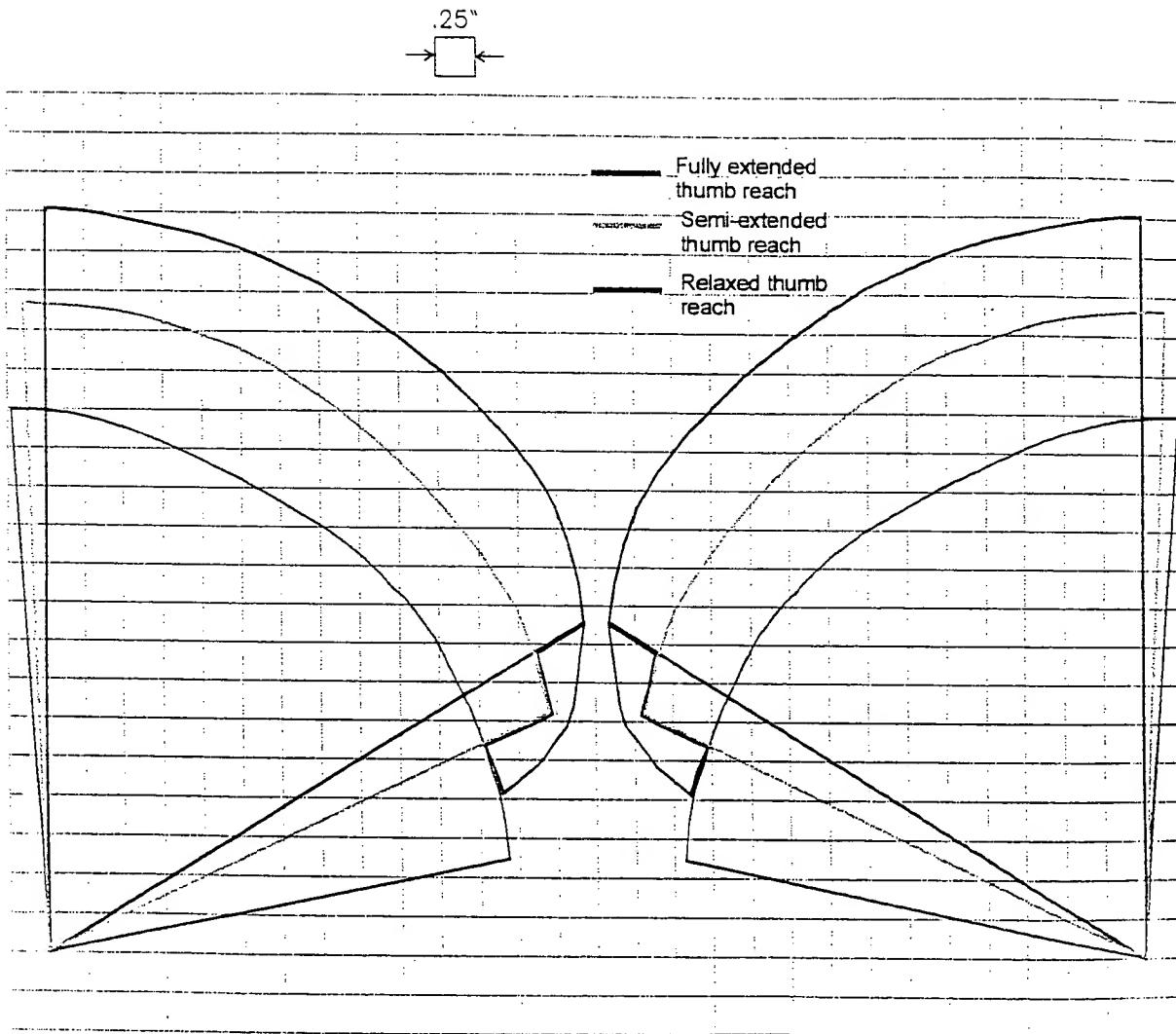
50th Percentile Combined Thumb Sweeps, Male+Females Age 12-19 (Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb
Left and right thumb envelopes are arbitrarily placed relative to each other
to permit cutting or measurements without overlapped reach lines

- Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device

Fig. 10 A

c30



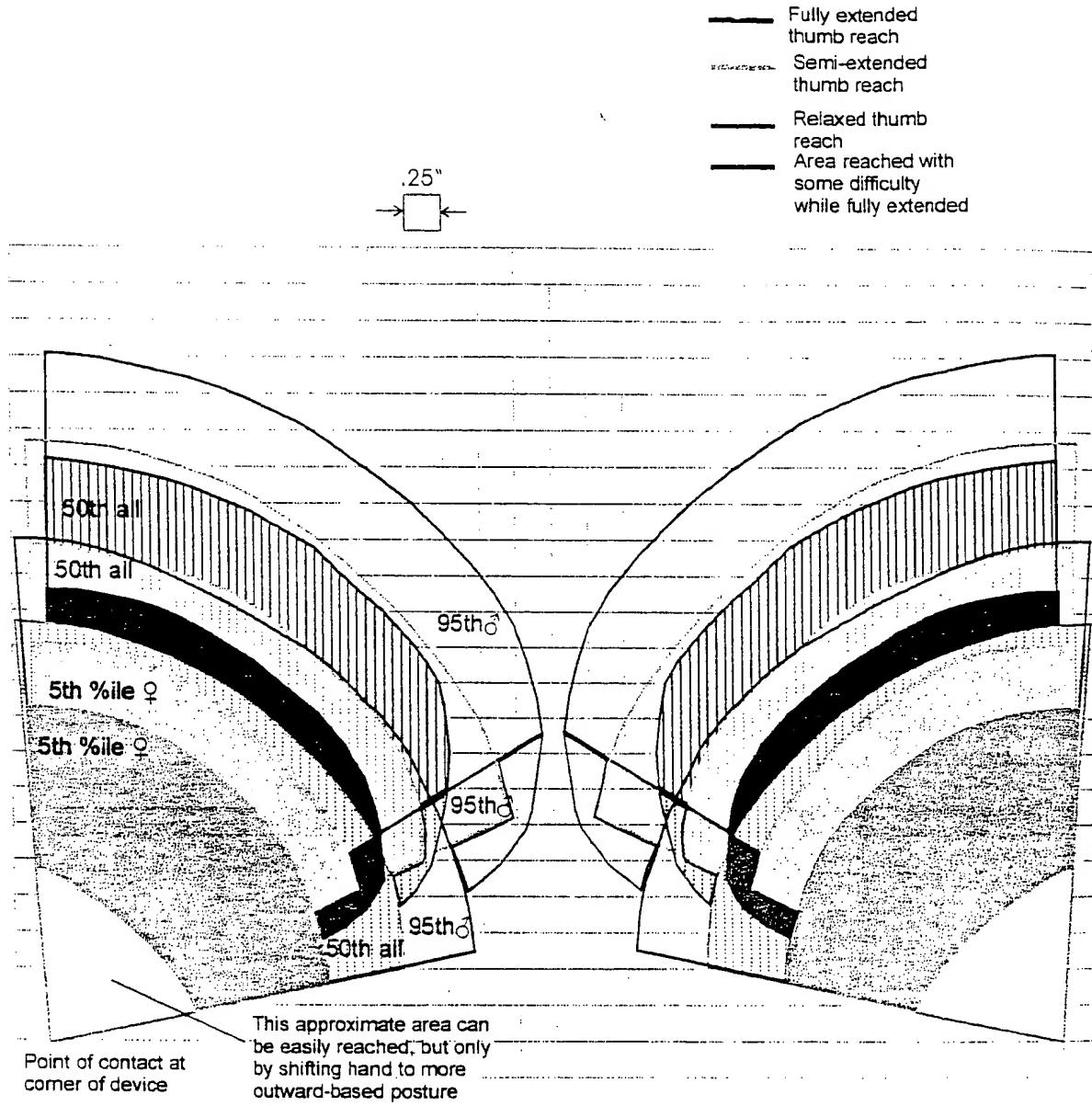
95th Percentile Combined Thumb Sweeps, Males Age 12-19
(Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb
Left and right thumb envelopes are arbitrarily placed relative to each other
to permit cutting or measurements without overlapped reach lines

- Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device

Fig 10Q

C31



Combined Thumb Sweeps, 1st Percentile Females Through 95th Percentile Males Age 12-19

(Uniform object thickness 0.75", corner radius 1.5")

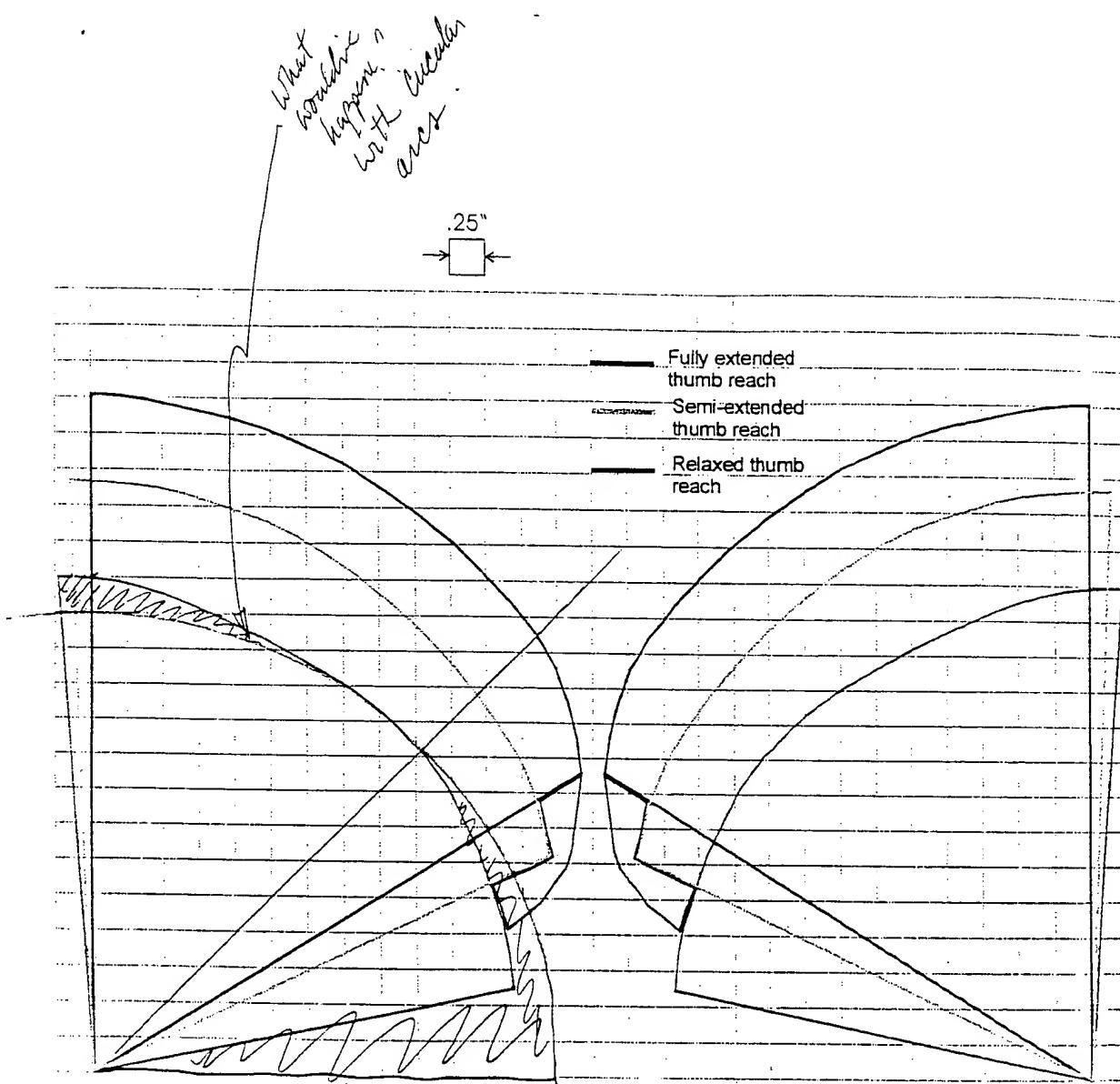
Notes: Each data point represents thumb tip at centerline of thumb
 Left and right thumb envelopes are arbitrarily placed relative to each other
 to permit cutting or measurements without overlapped reach lines

Located vertically over point of thumb base contact with corner,
 at midpoint of lower corner radius on device

Fig 10R

C32

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GTH *-mldr*
1st Percentile Combined Thumb Sweeps, Females Age 12-19
(Uniform object thickness 0.75", corner radius 1.5")

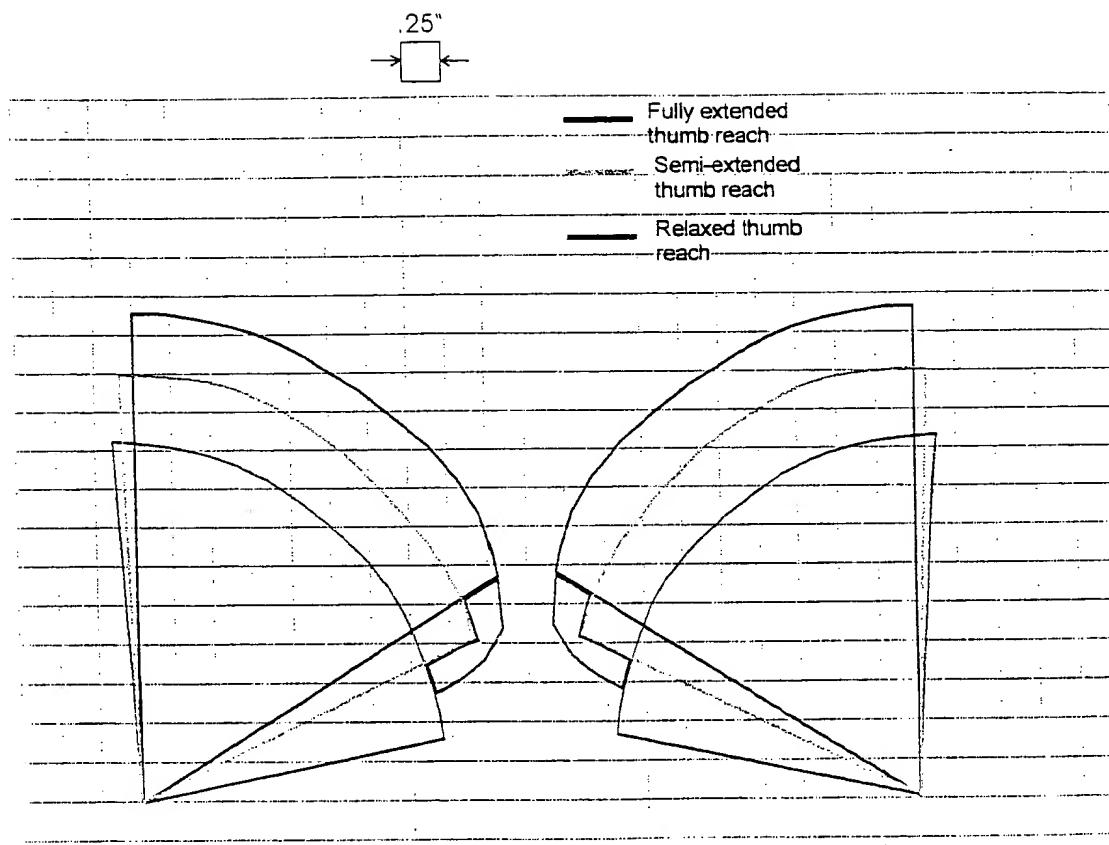
Note: each data point represents thumb tip at centerline of thumb

* Located vertically over point of thumb base contact with corner,
at midpoint of lower corner radius on device

Fig 10.5

033

2005-03-28 10:44:56



1st Percentile Combined Thumb Sweeps, Females Age 12-19
(Uniform object thickness 0.75", corner radius 1.5")

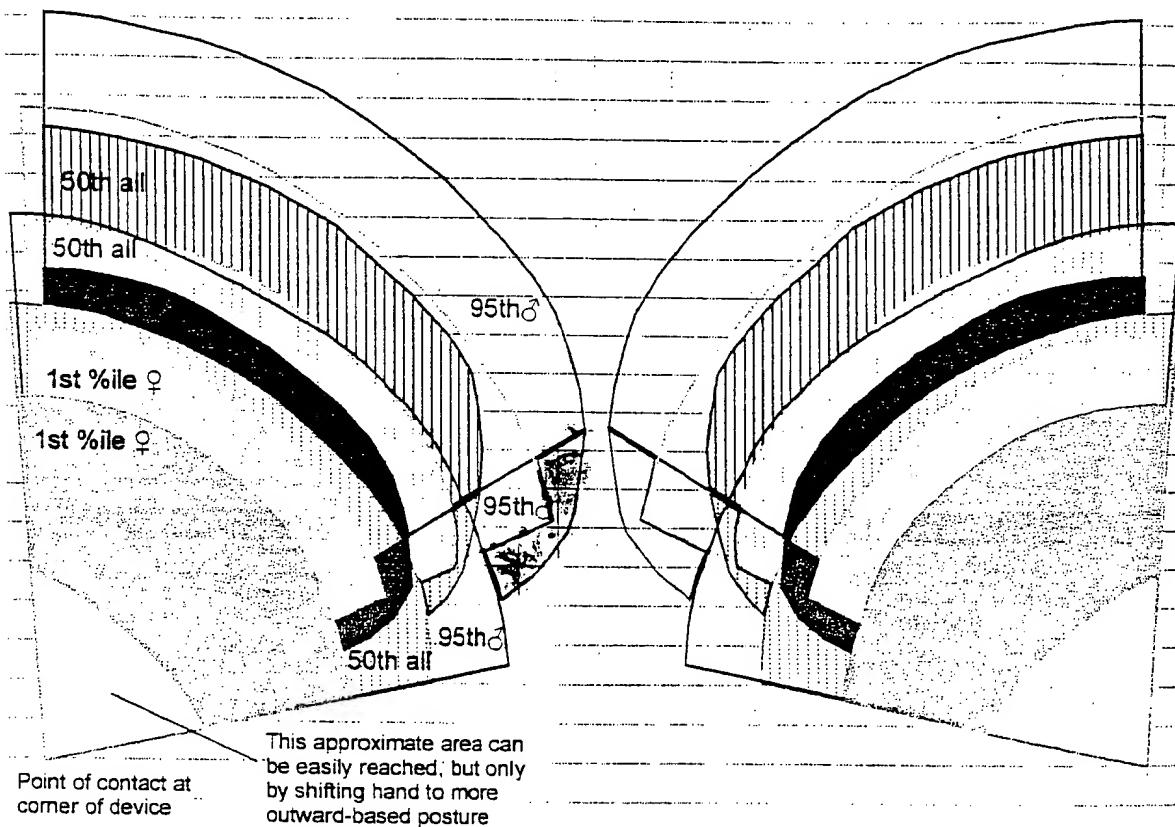
Notes: Each data point represents thumb tip at centerline of thumb
Left and right thumb envelopes are arbitrarily placed relative to each other
to permit cutting or measurements without overlapped reach lines

Fig. 10T

c34

- Fully extended thumb reach
- Semi-extended thumb reach
- Relaxed thumb reach
- Area reached with some difficulty while fully extended

.25"
→ 



Combined Thumb Sweeps, 1st Percentile Females Through 95th Percentile Males Age 12-19

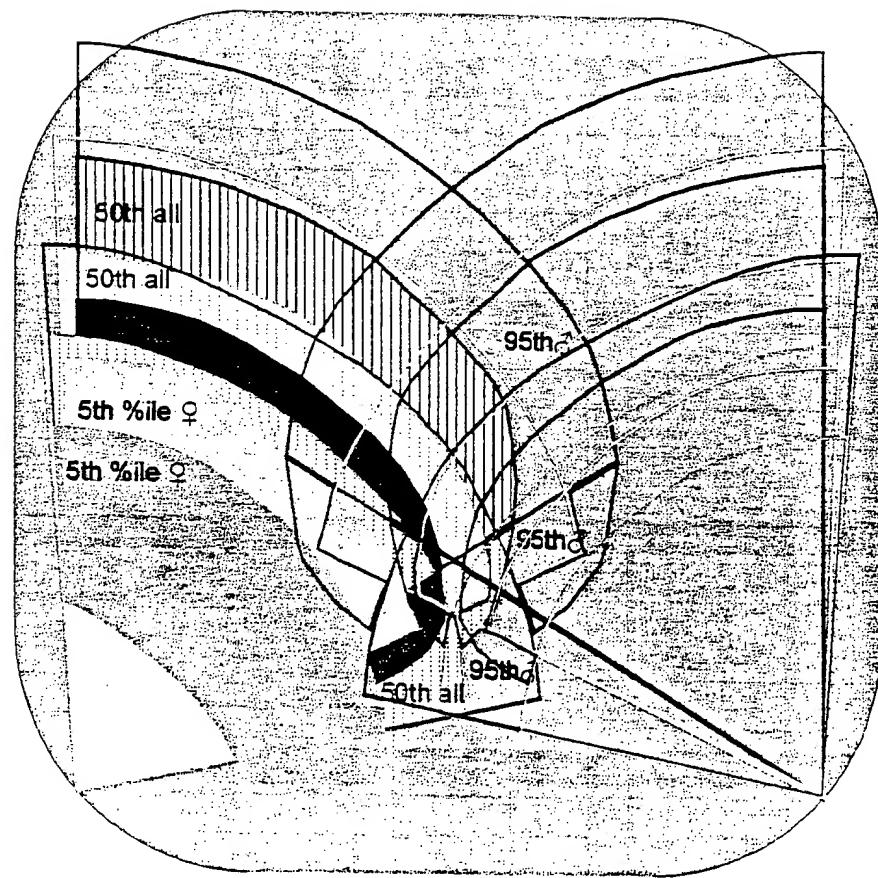
(Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb
Left and right thumb envelopes are arbitrarily placed relative to each other
to permit cutting or measurements without overlapped reach lines

Fig 106

Located vertically over point of thumb base contact with corner,
at midpoint of lower corner radius on device

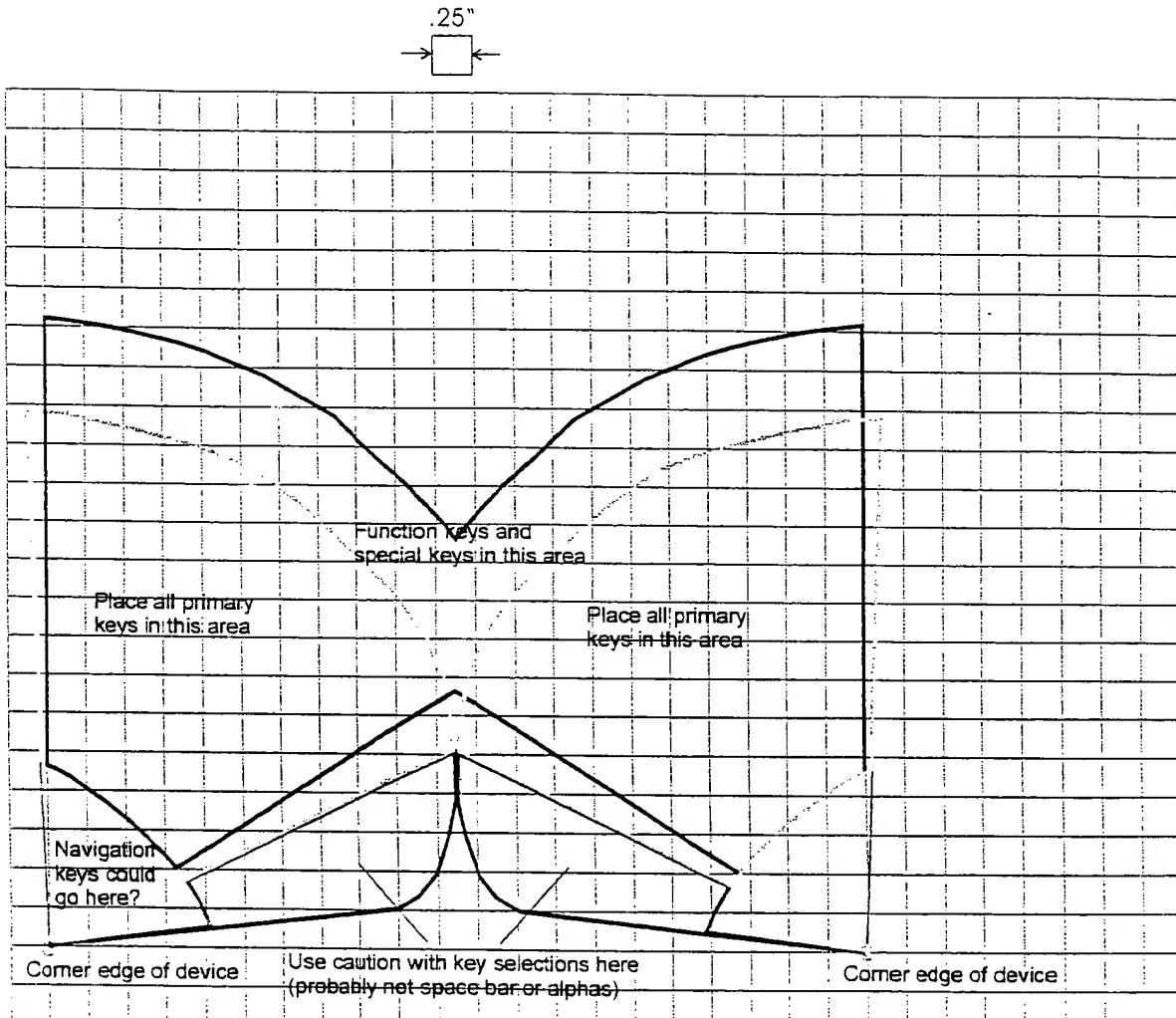
035



Thumb sweeps on 1.5 corner template, 5.5“ (50th percentile relaxed reaches overlap 0.15 in.)

Fig 10v

C36



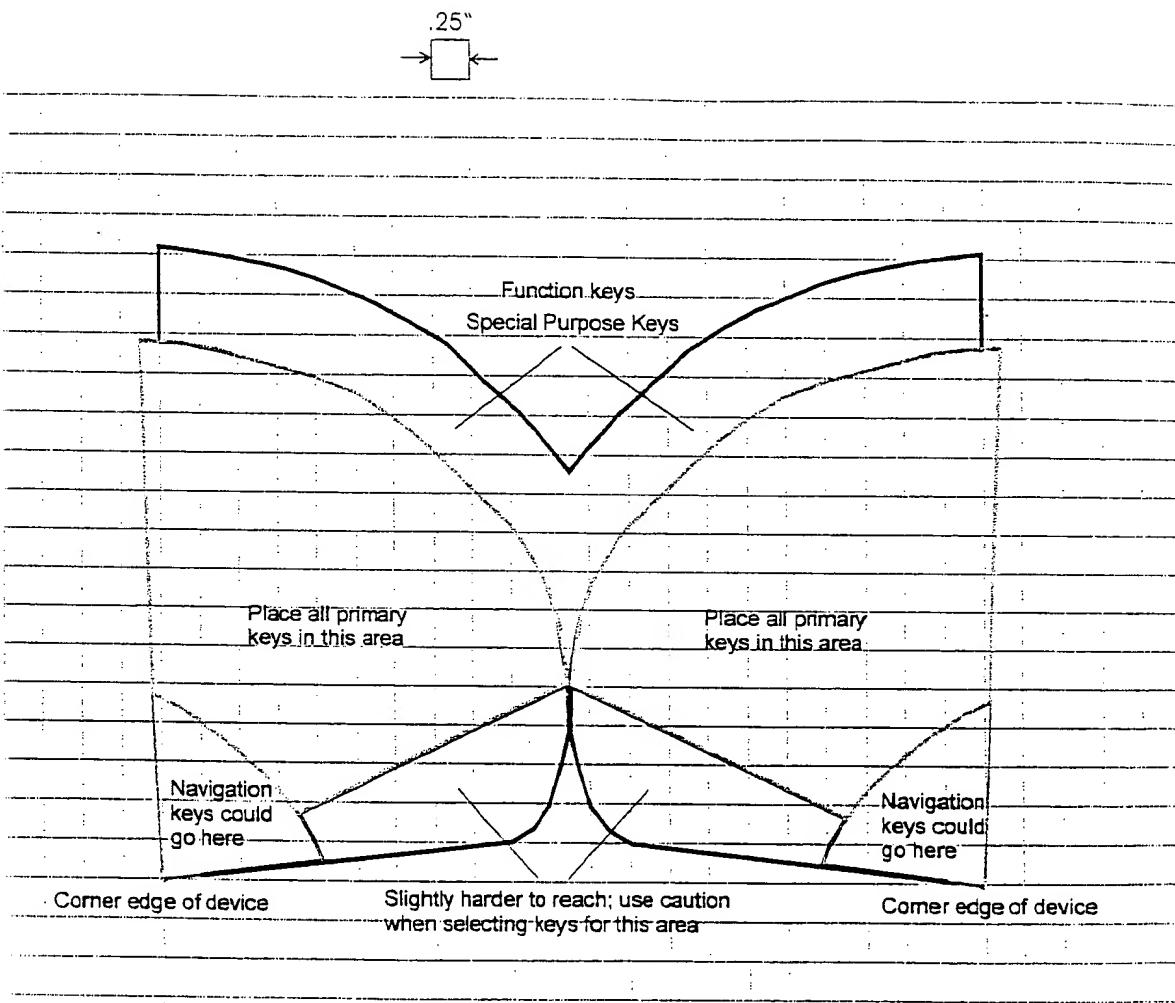
Key Placement Guidelines

(Uniform object thickness 0.75", corner radius 1.5")

Using 50th percentile semi-extended reach for primary keying area

Fig 10W

c37



Key Placement Guidelines

Device thickness 0.75" (uniform), corner radius 1.5" (plan view), corner radius approx. 1.0" (side view)

Notes:

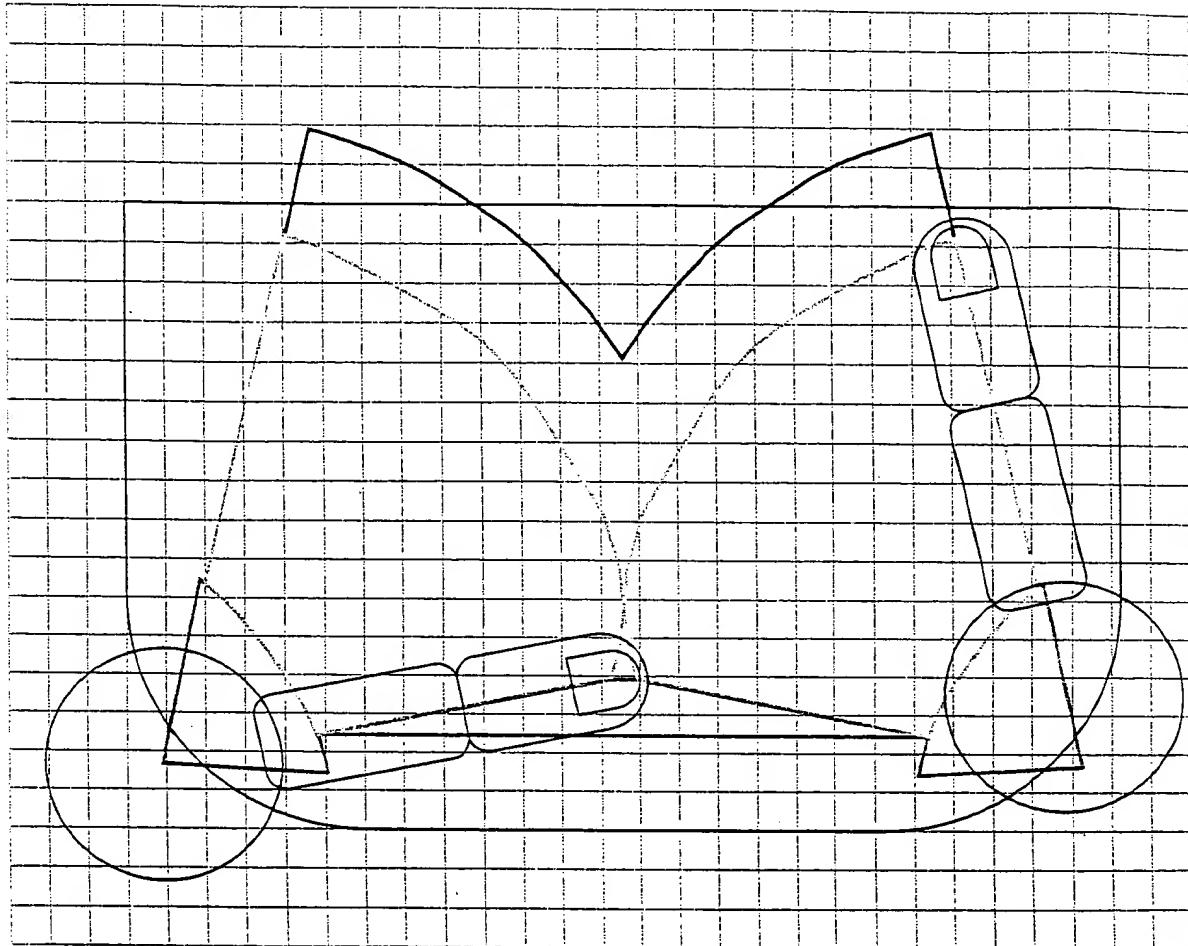
For device thickness of 0.75 in., keying area width is approx. 5.5 in.
 Reach areas are valid for placement of thumbs at corner or along sides
 Smaller corner radii decrease reach areas but permit easier reach into blue areas
 Device thicknesses greater than 0.75 in. quickly decrease size of reach areas
 Reach plots generally indicate a device width of approx. 6.0 in.

Fig 10X

C38

25"

Belt From Brock



combined male and female

1. Used reach envelope of 50% ~~woman~~ with relaxed grip (not pitch or extended reach).
2. Drew geometry to represent the approx dims of 50% woman. Circle represents the palm at the base and crotch of the thumb.
3. Rotated the reach envelope approx 15° to more closely resemble the hand posture of holding a game controller.

Fig 10Y

c 39

Automated Wrapping Process

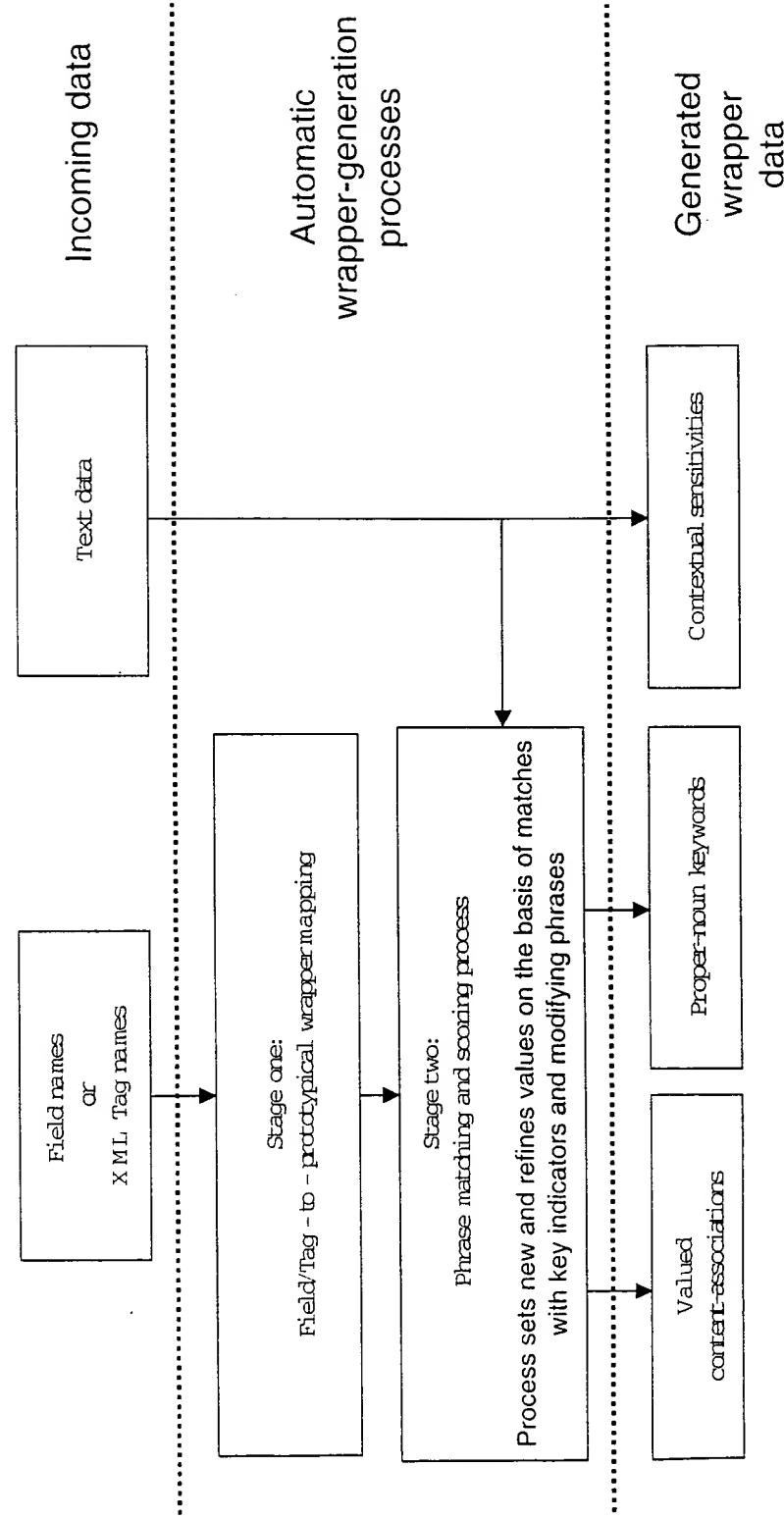
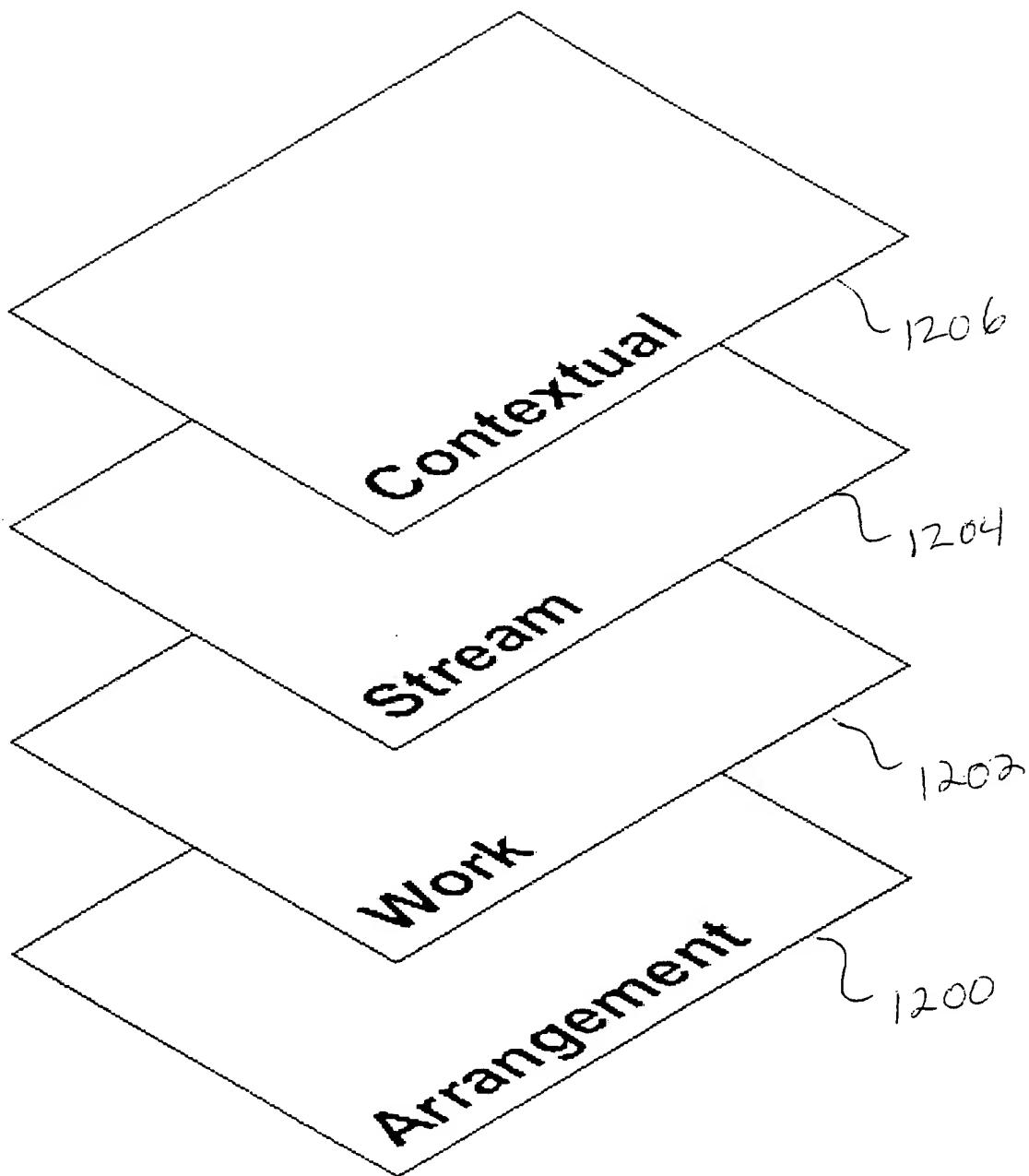


Figure 1.1



79.12

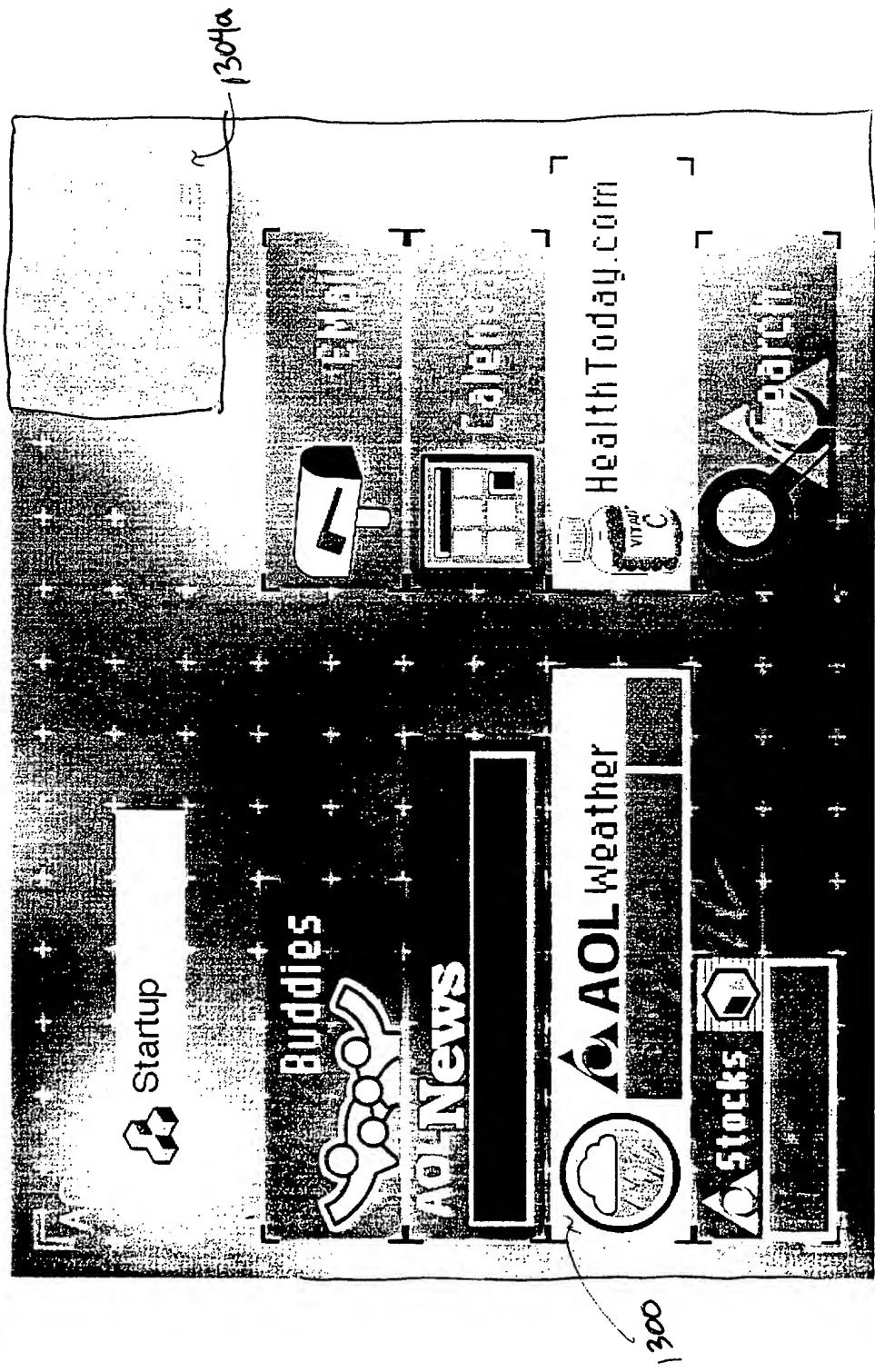


Fig. 13A

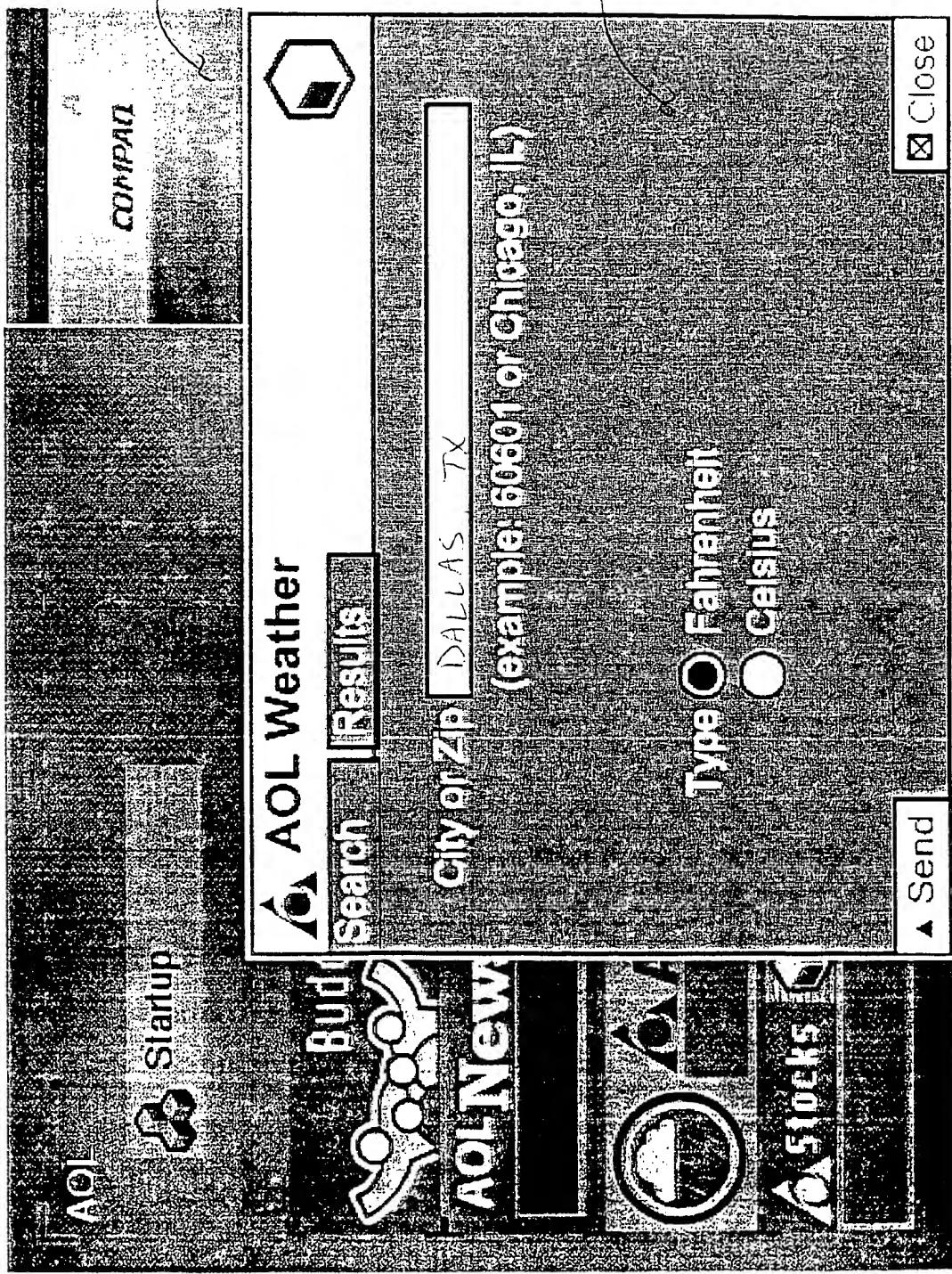


Fig. 136

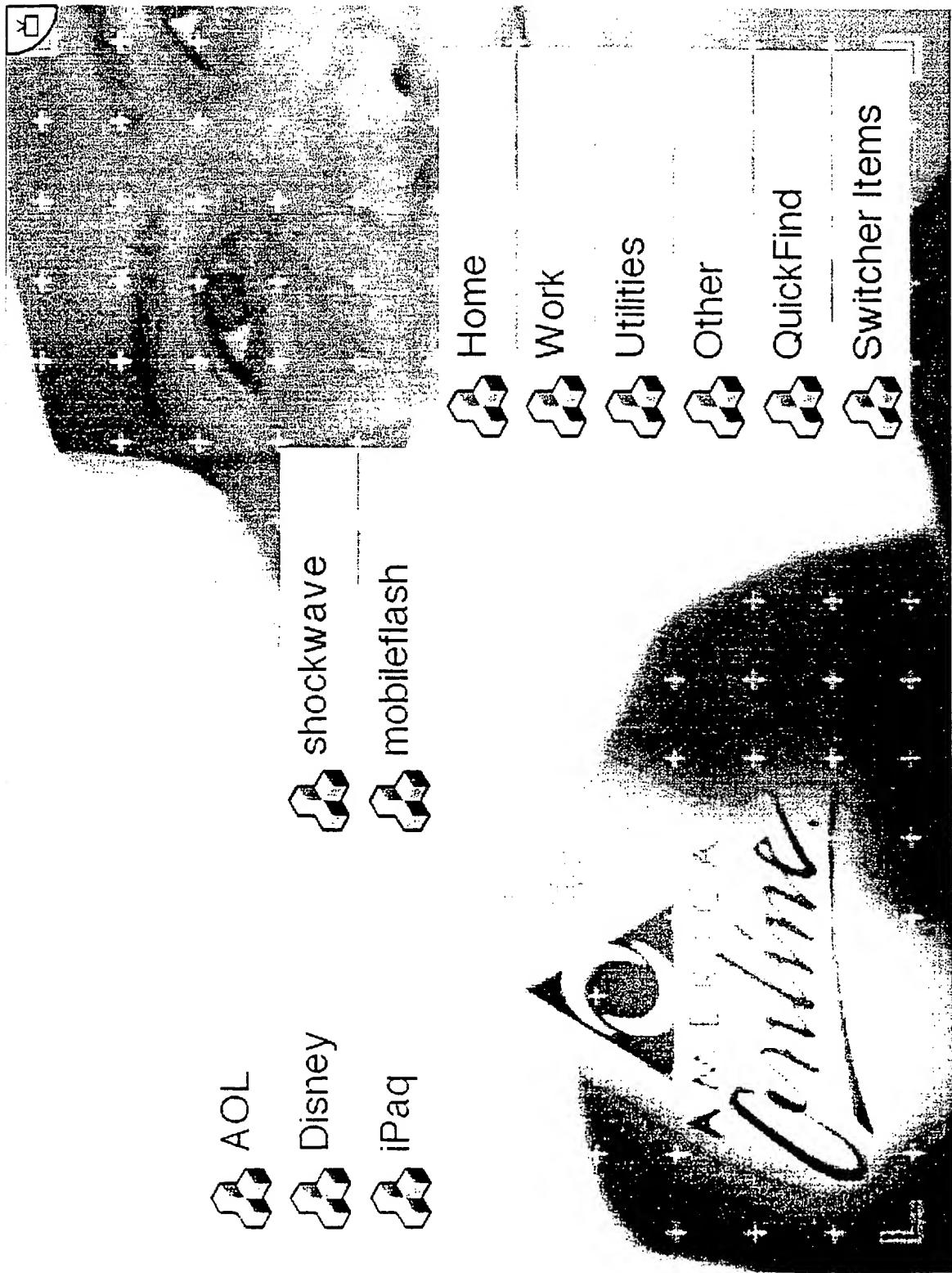


Fig. 14A

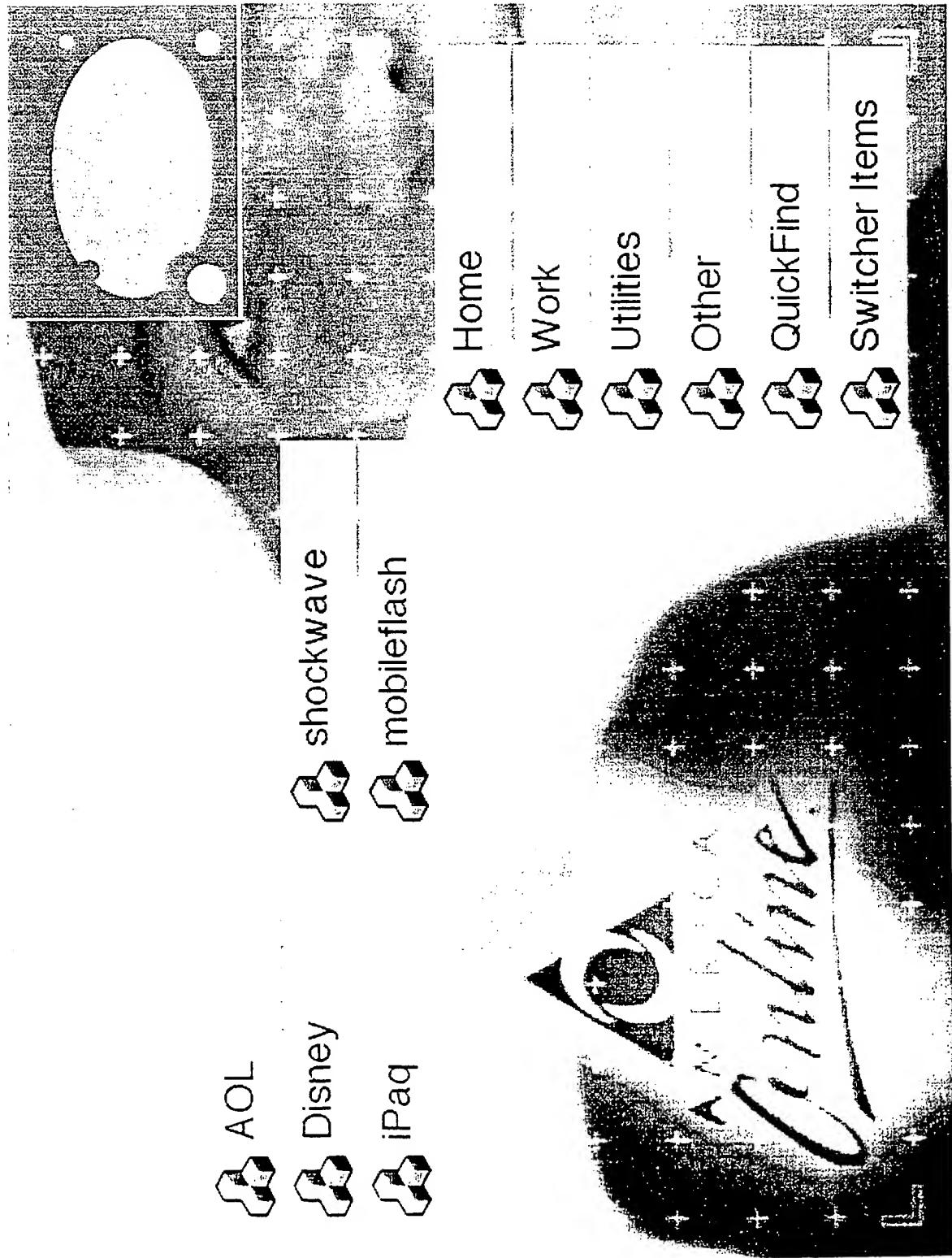


Fig 14B

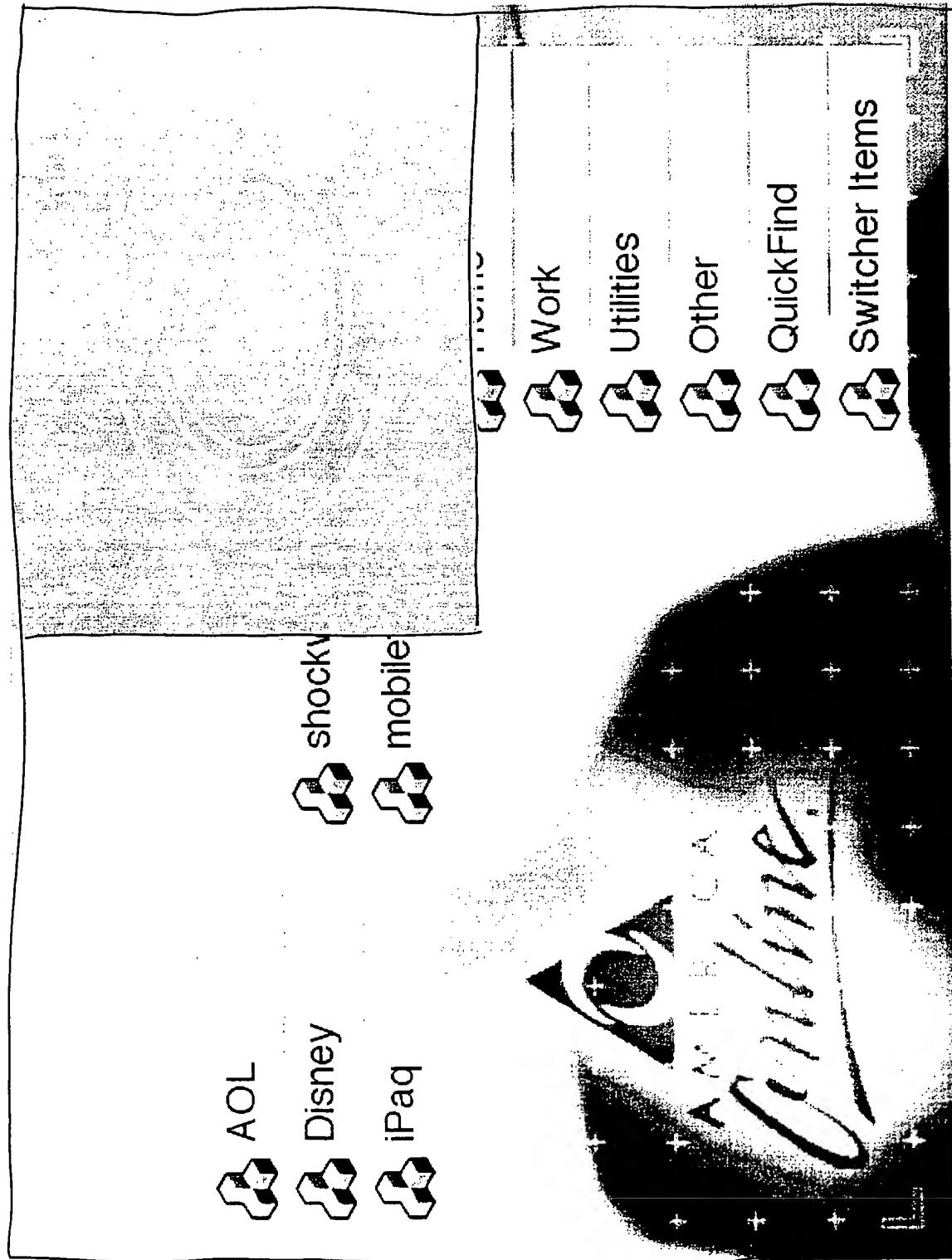


Fig 14c

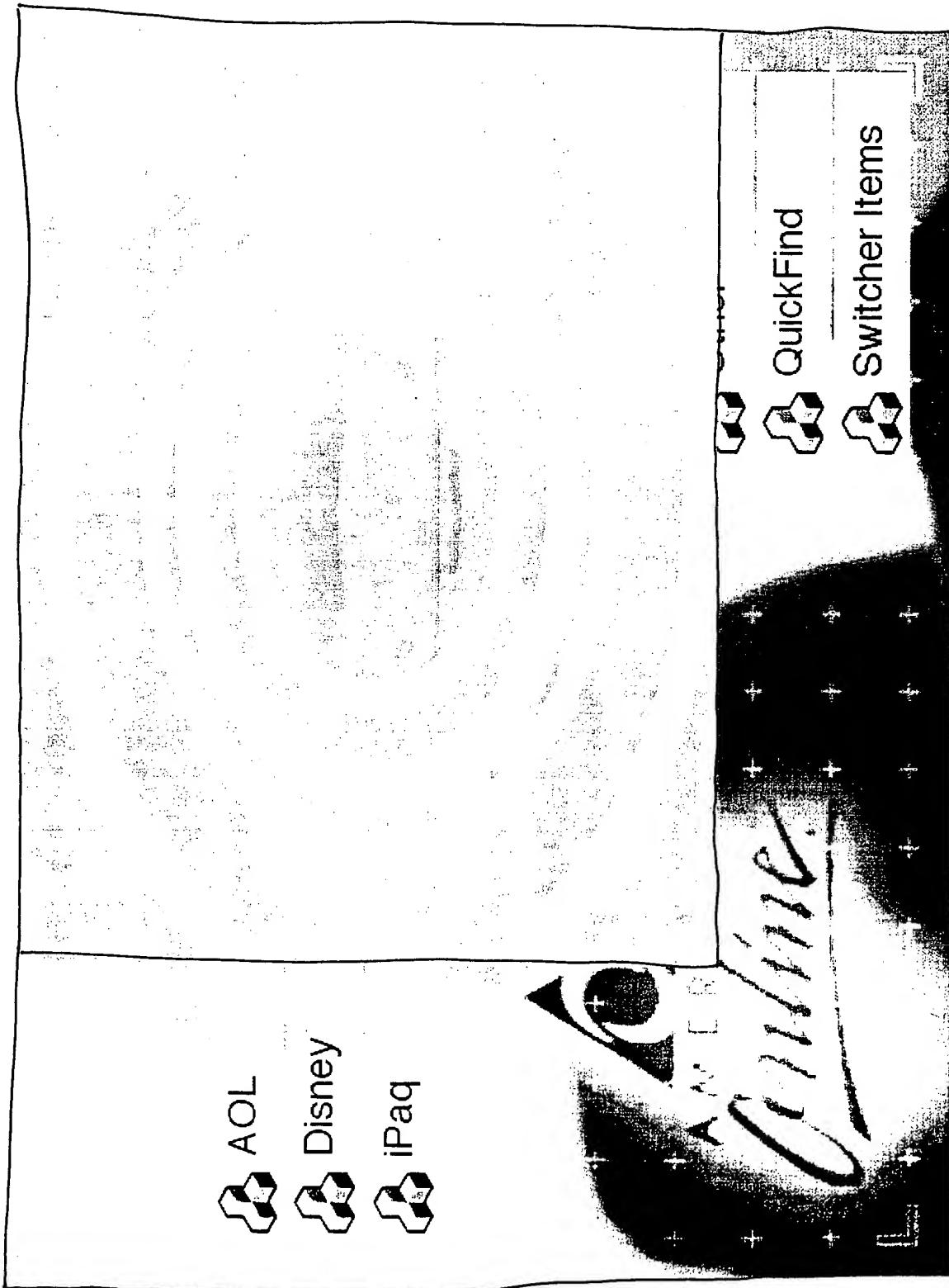


Fig 14D

03944482 - 0343502

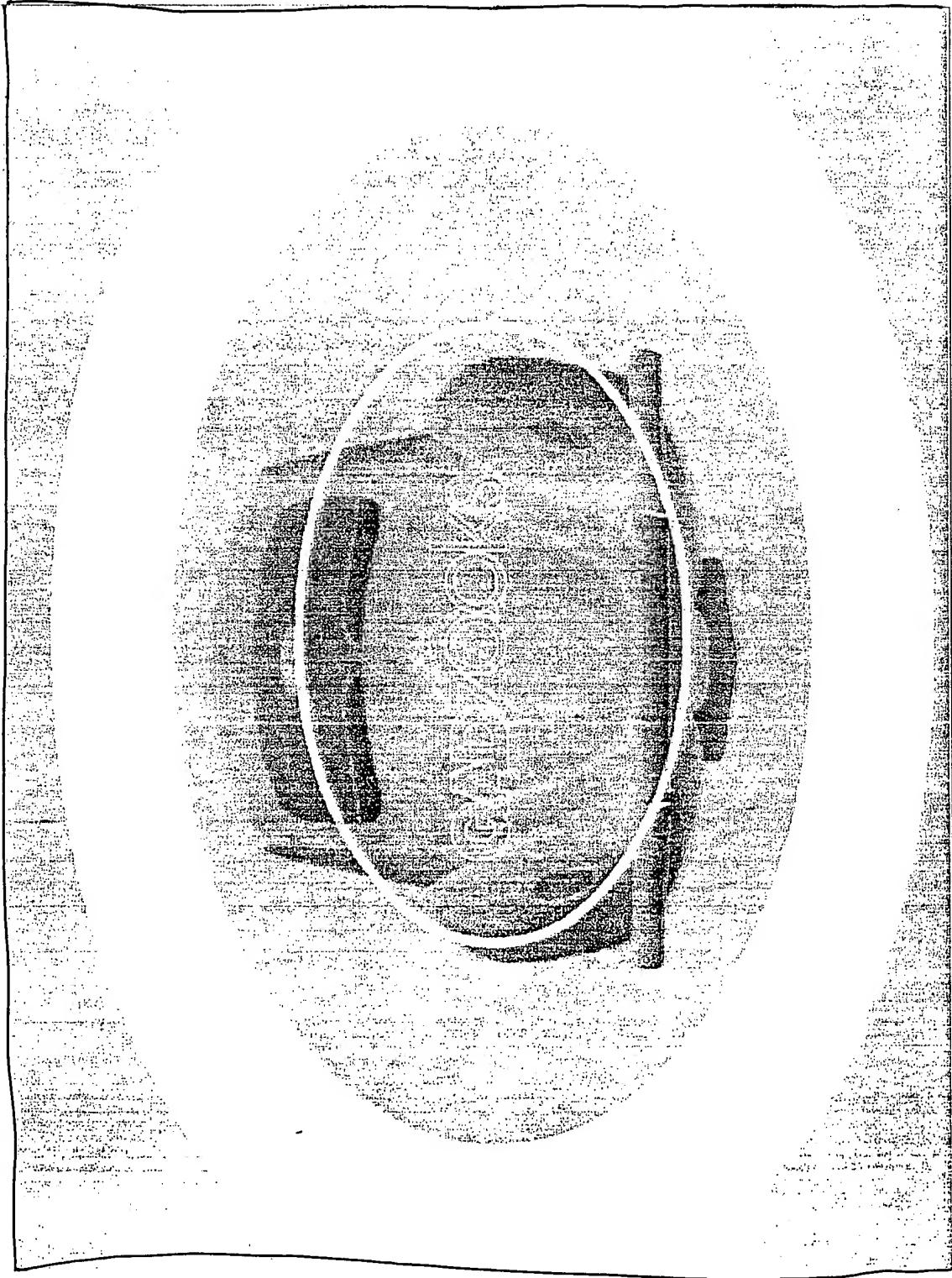
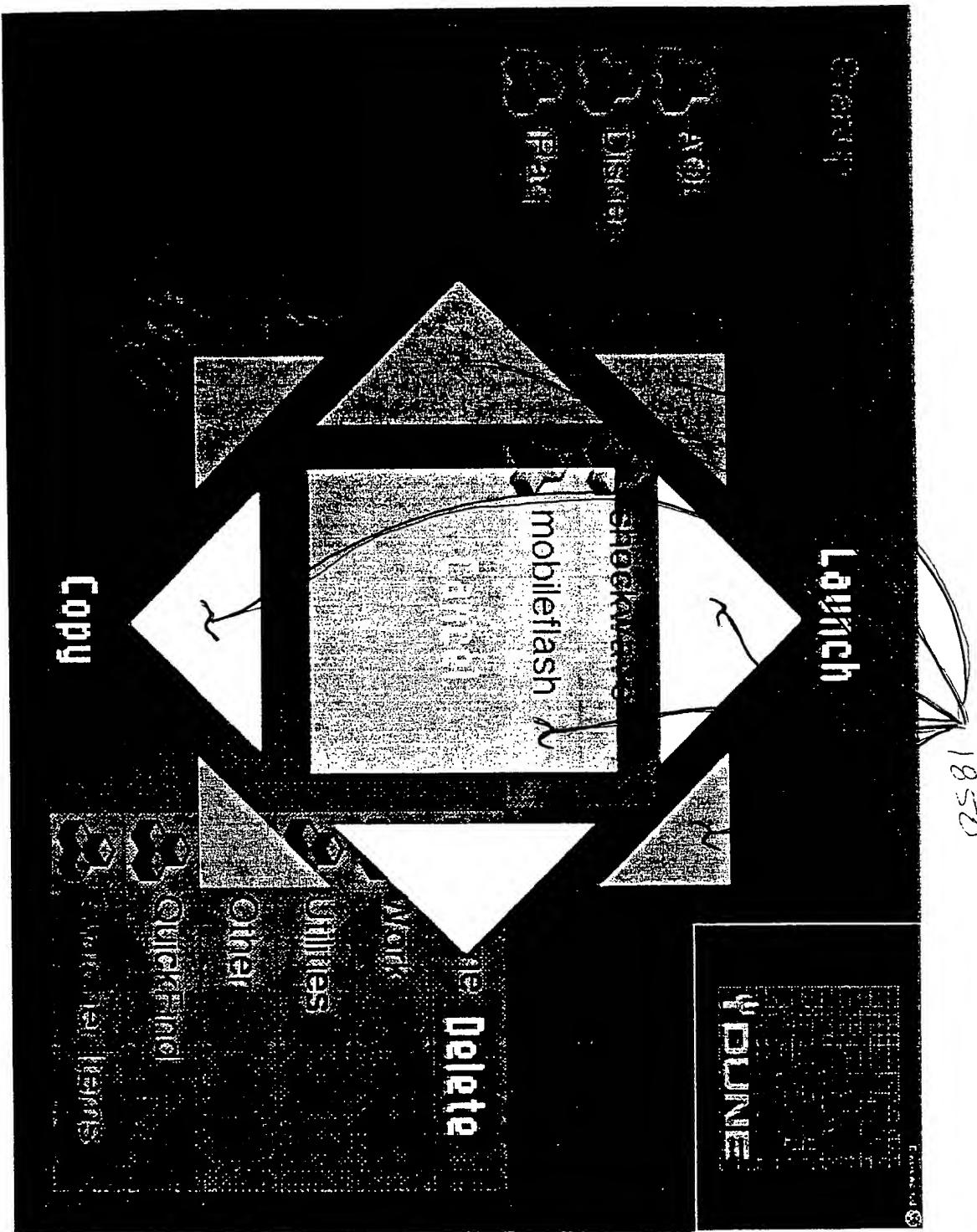


Fig 14E



and the *Journal of the Royal Society of Medicine* (1992) 85, 101-102.

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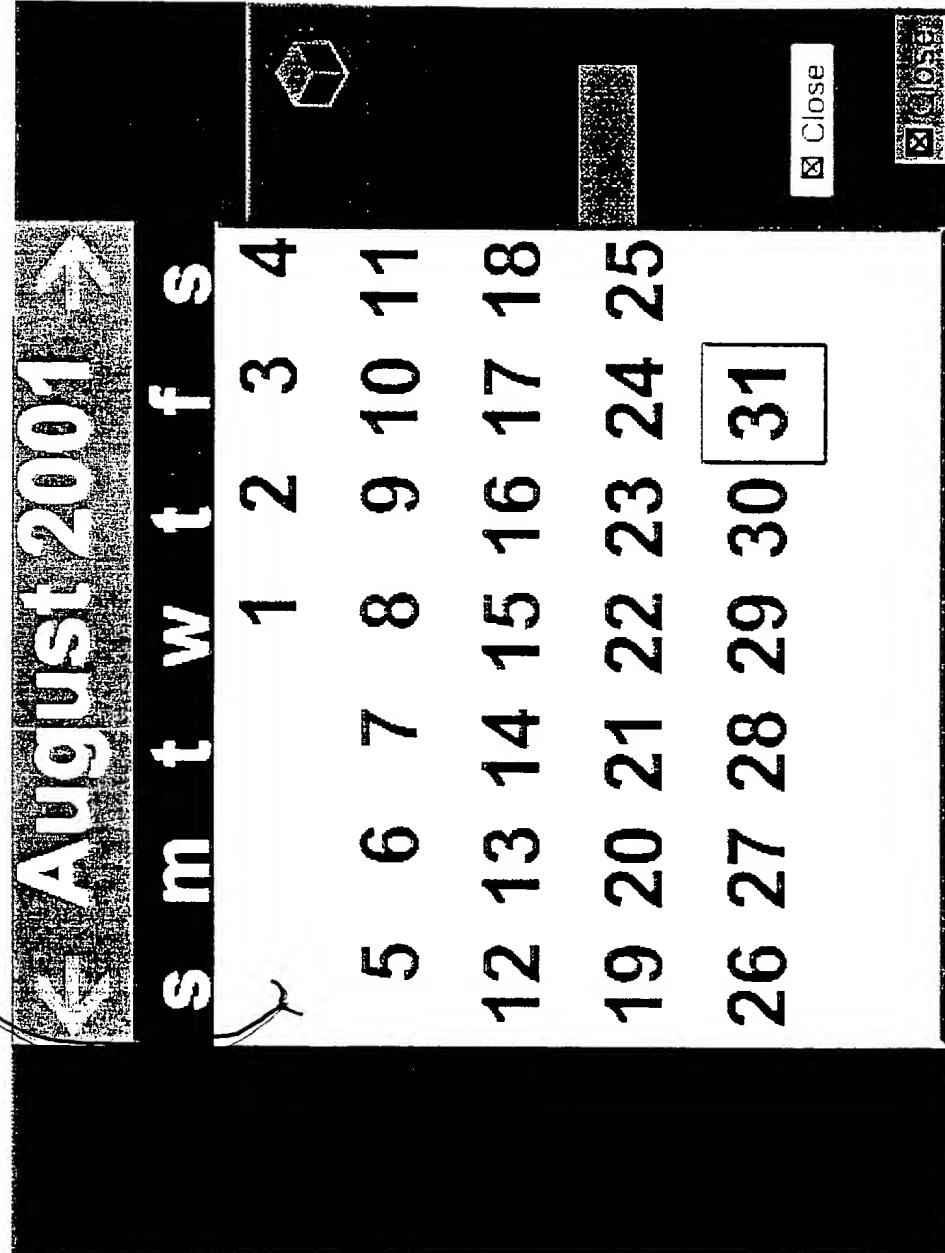


Fig. 16

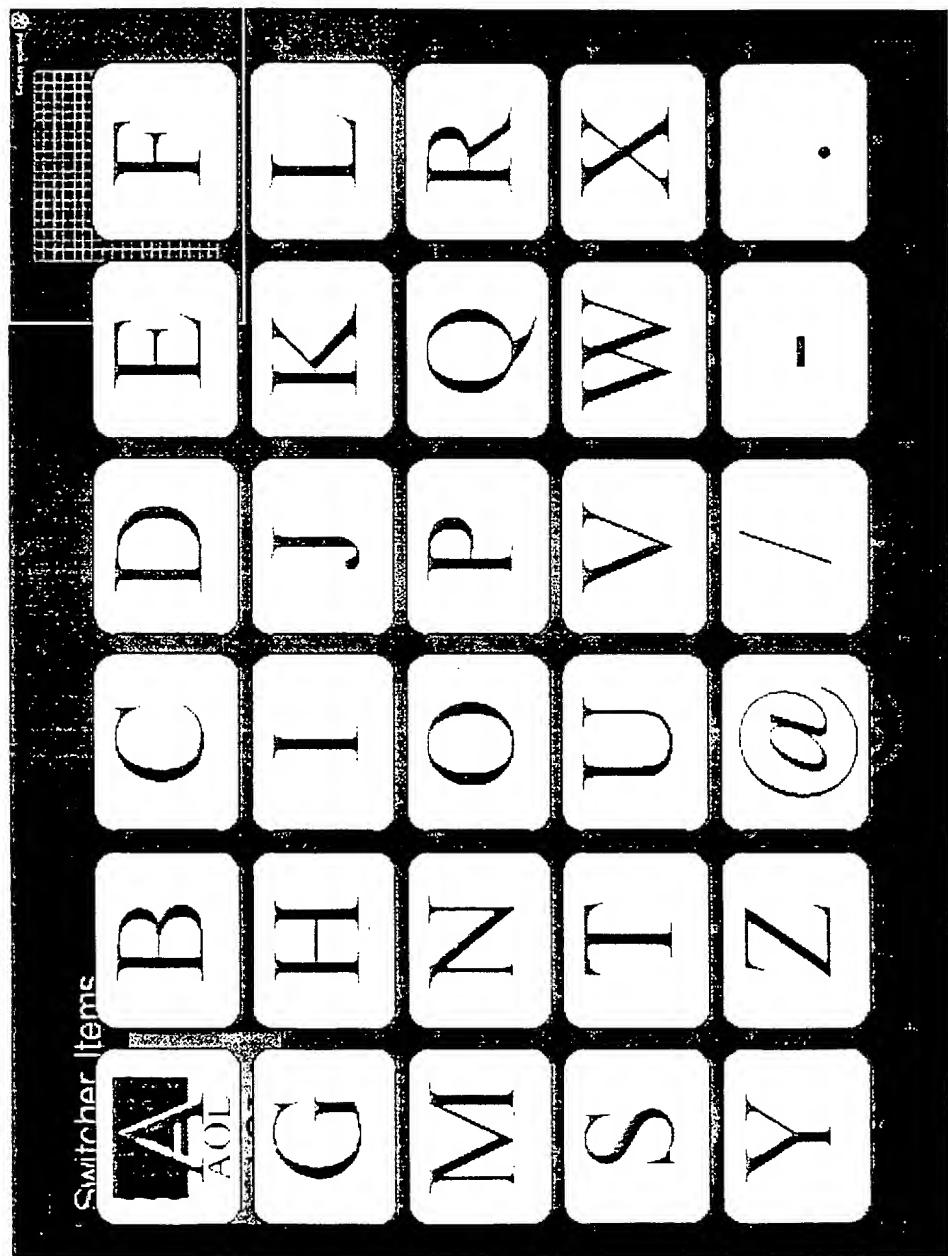


Fig. 17A

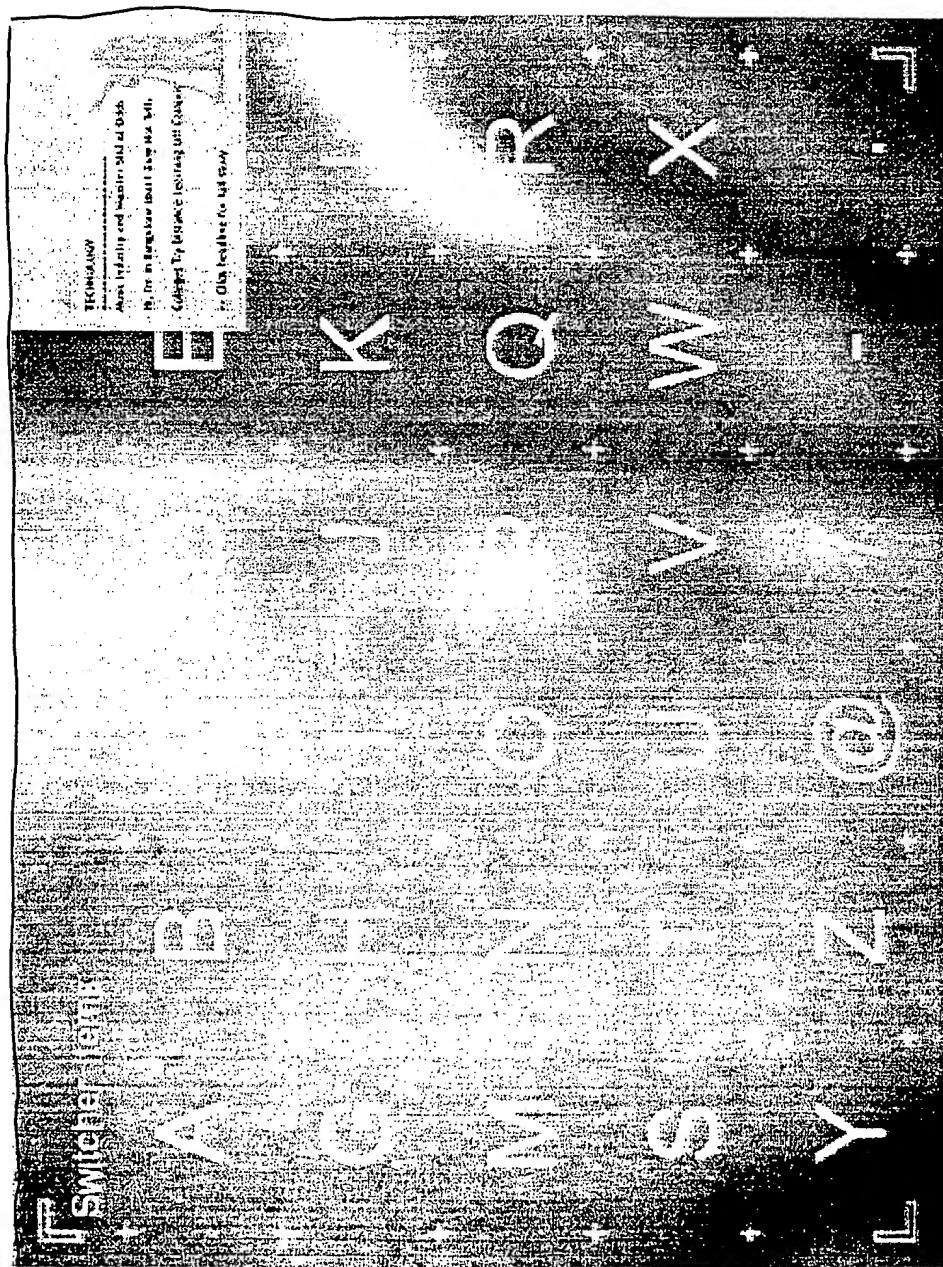


Fig 17B

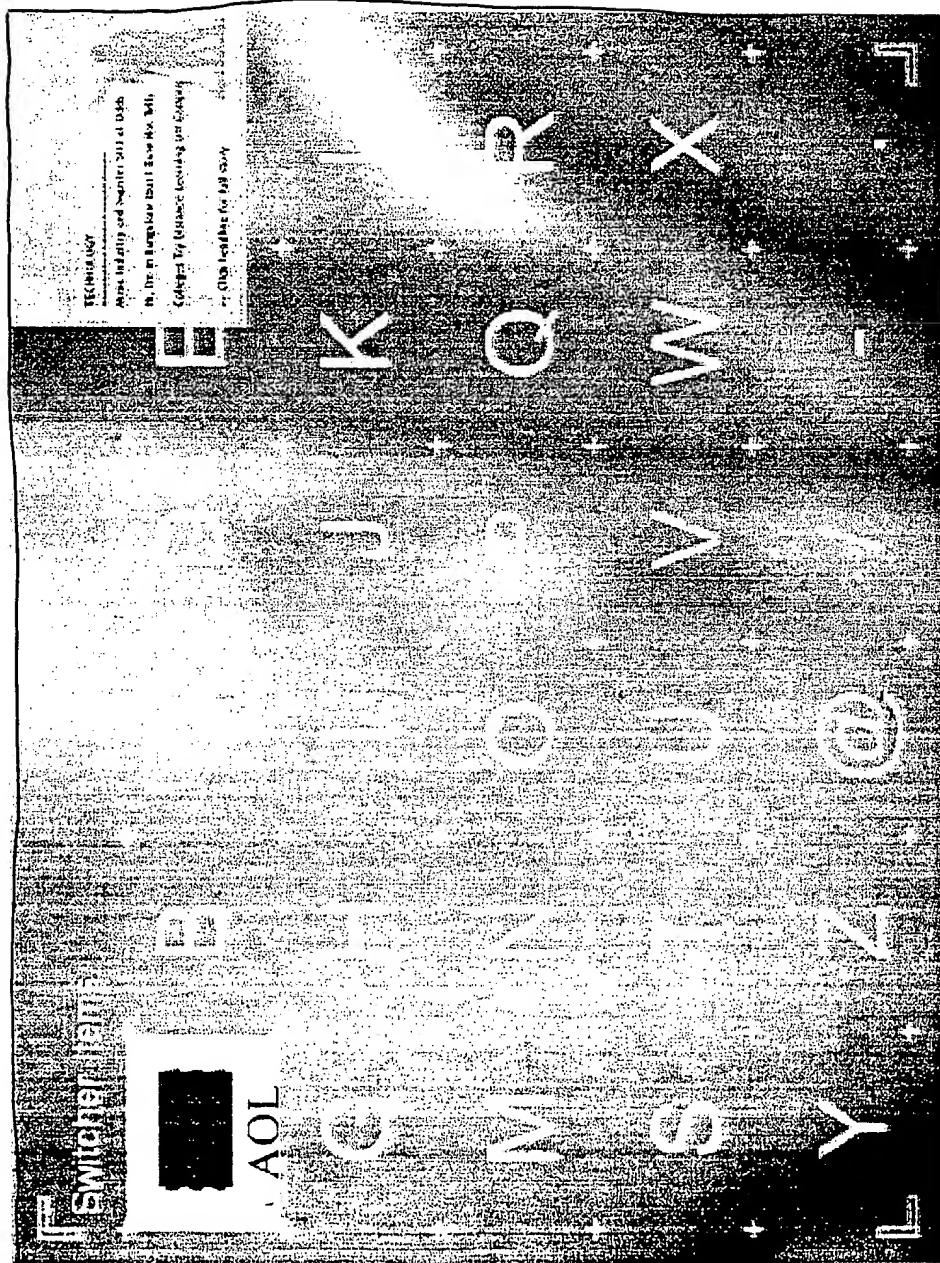


Fig. 17c

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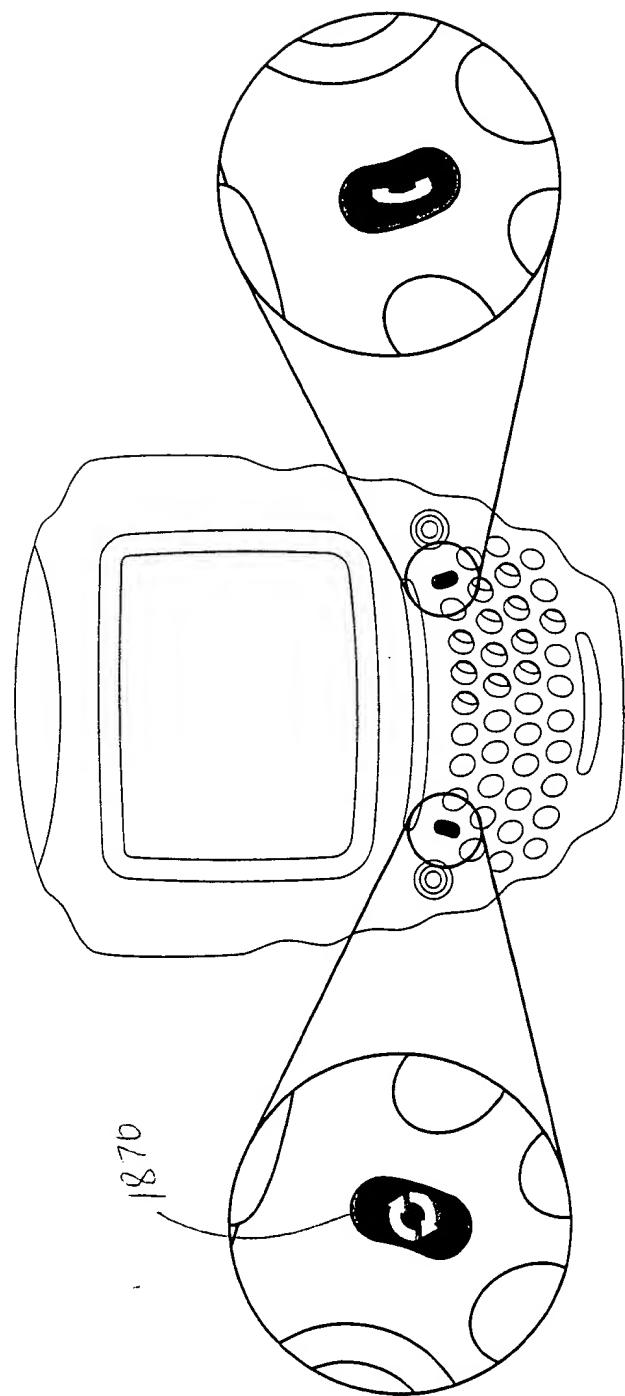


Fig 17D

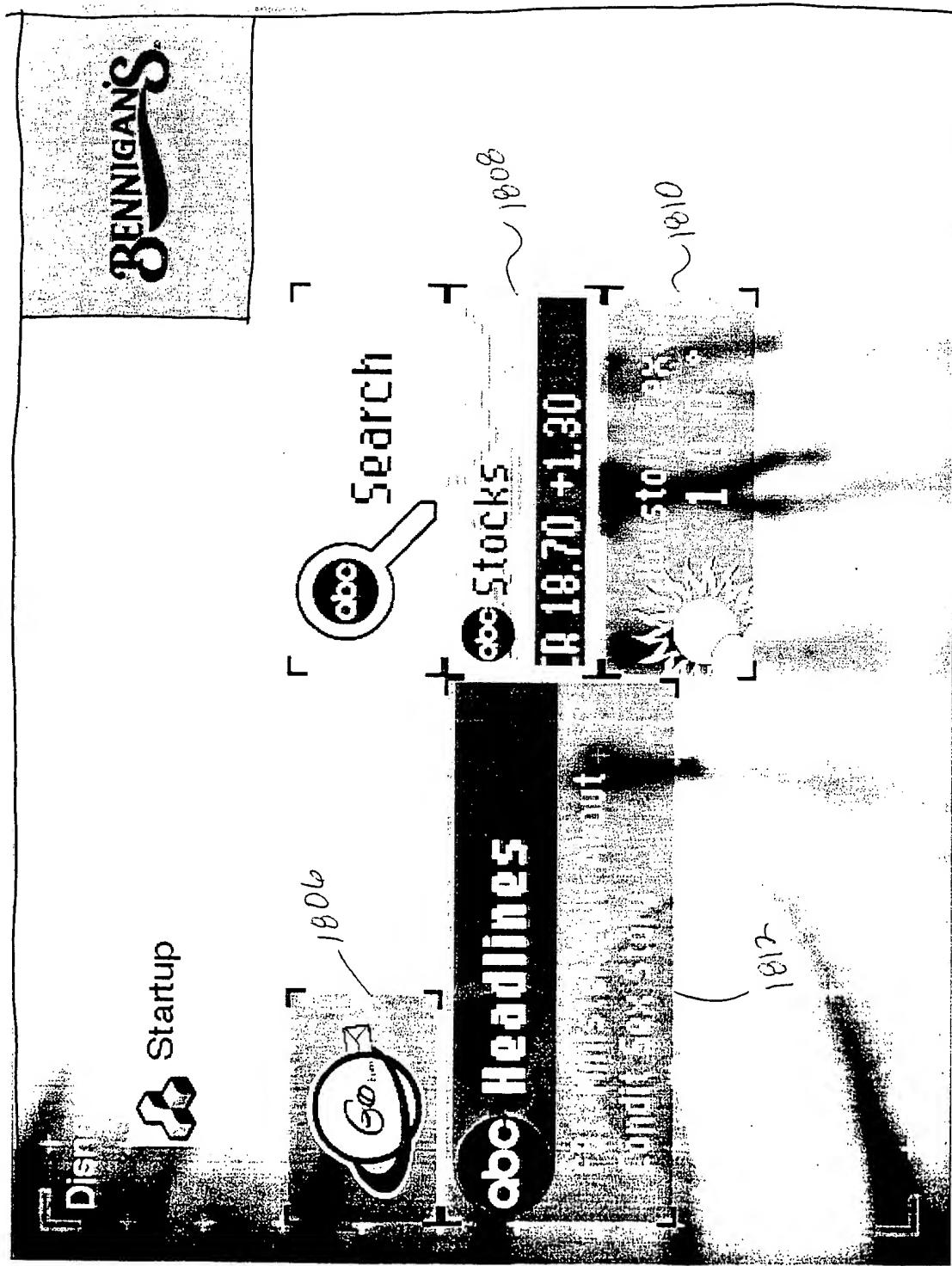


Fig. 18A

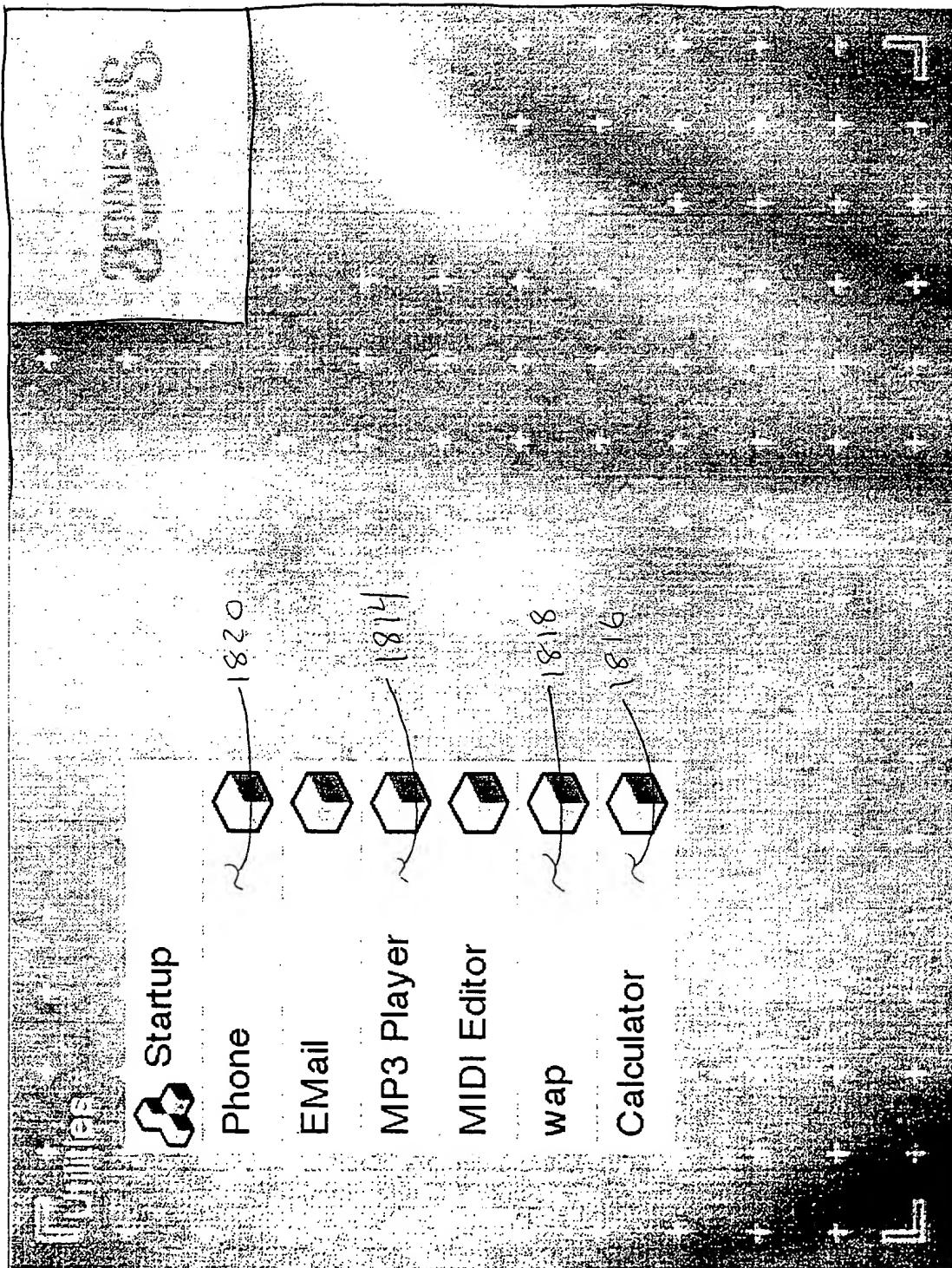


Fig 18B

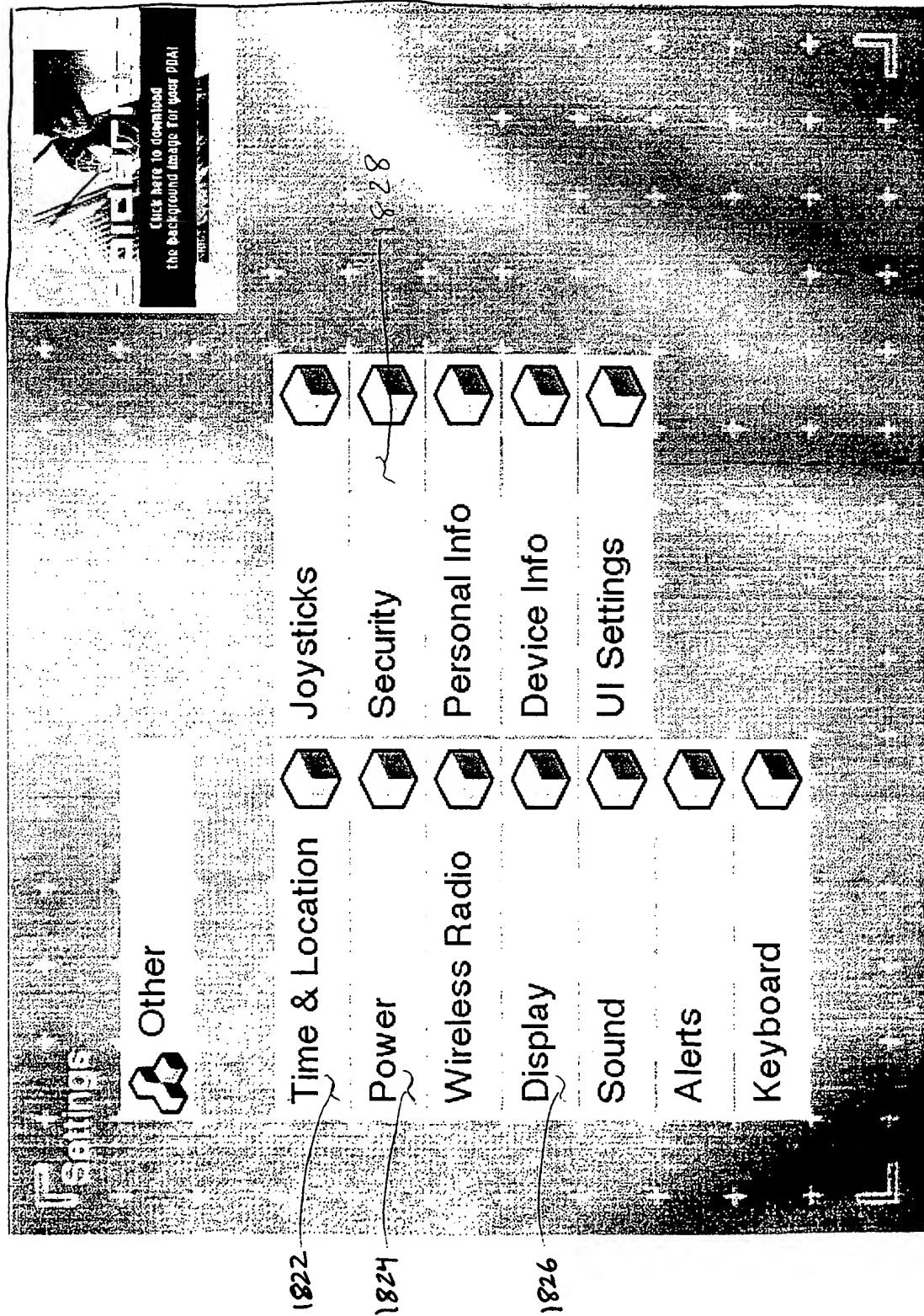
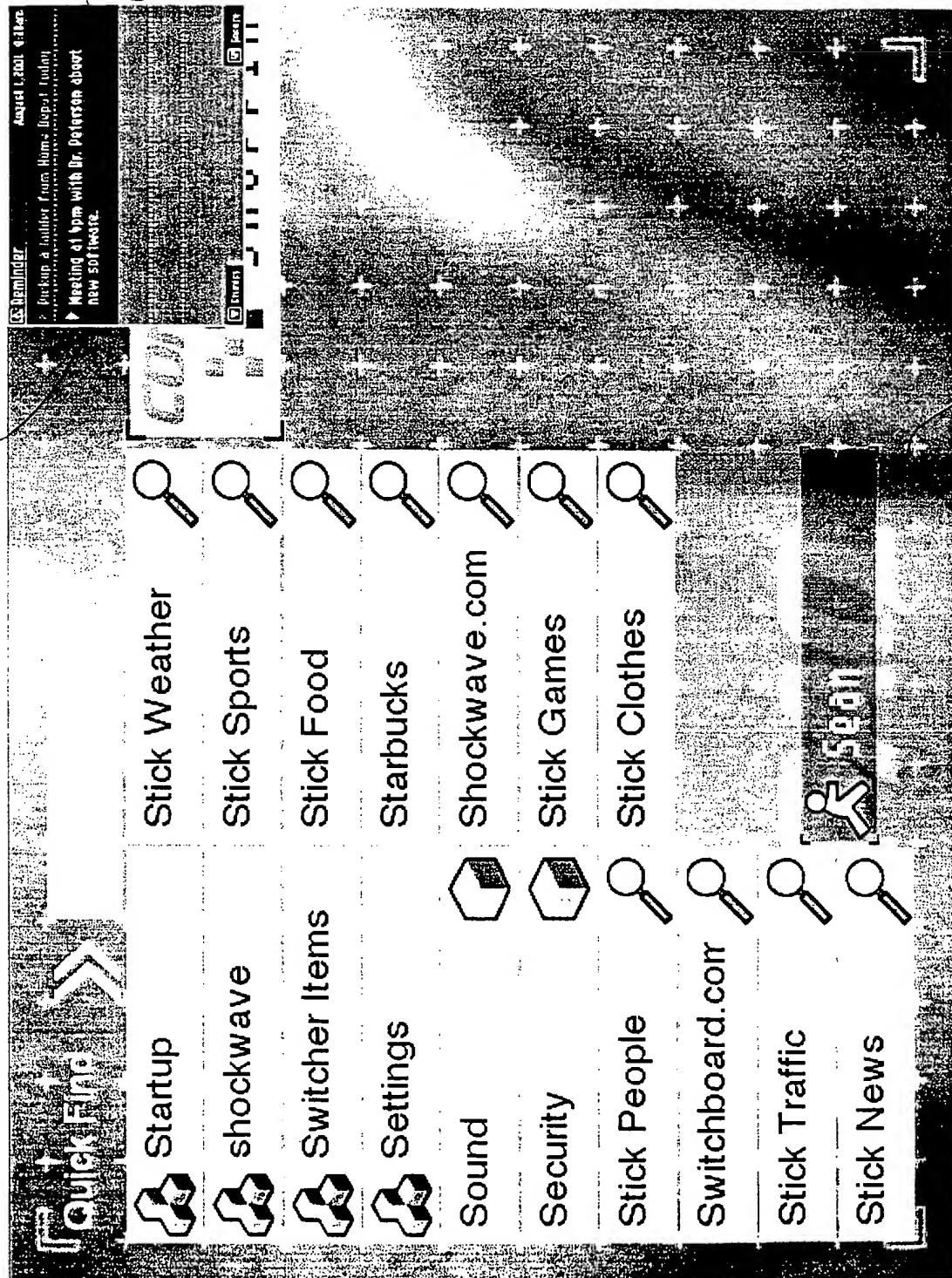


Fig 18c

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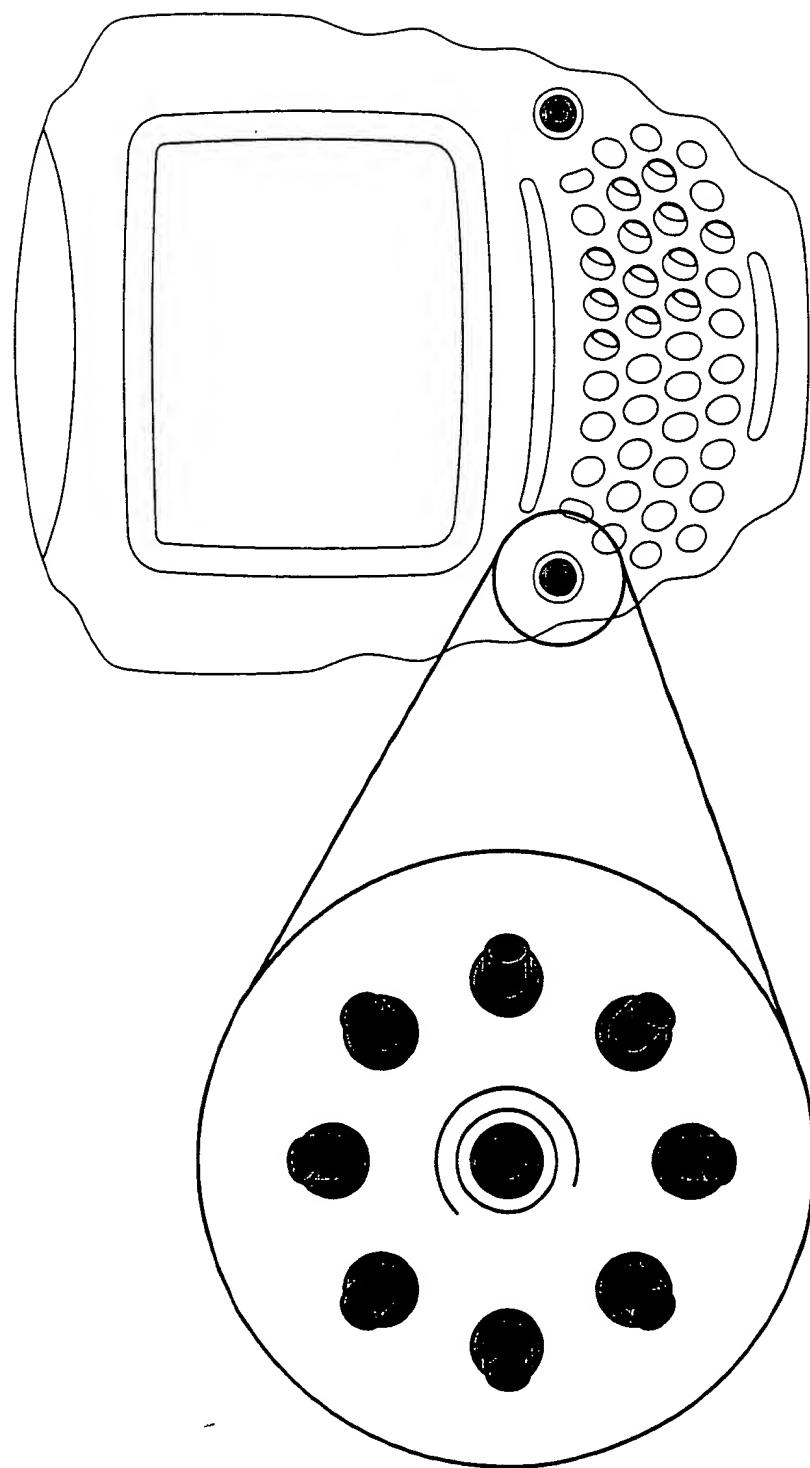


Fig 19